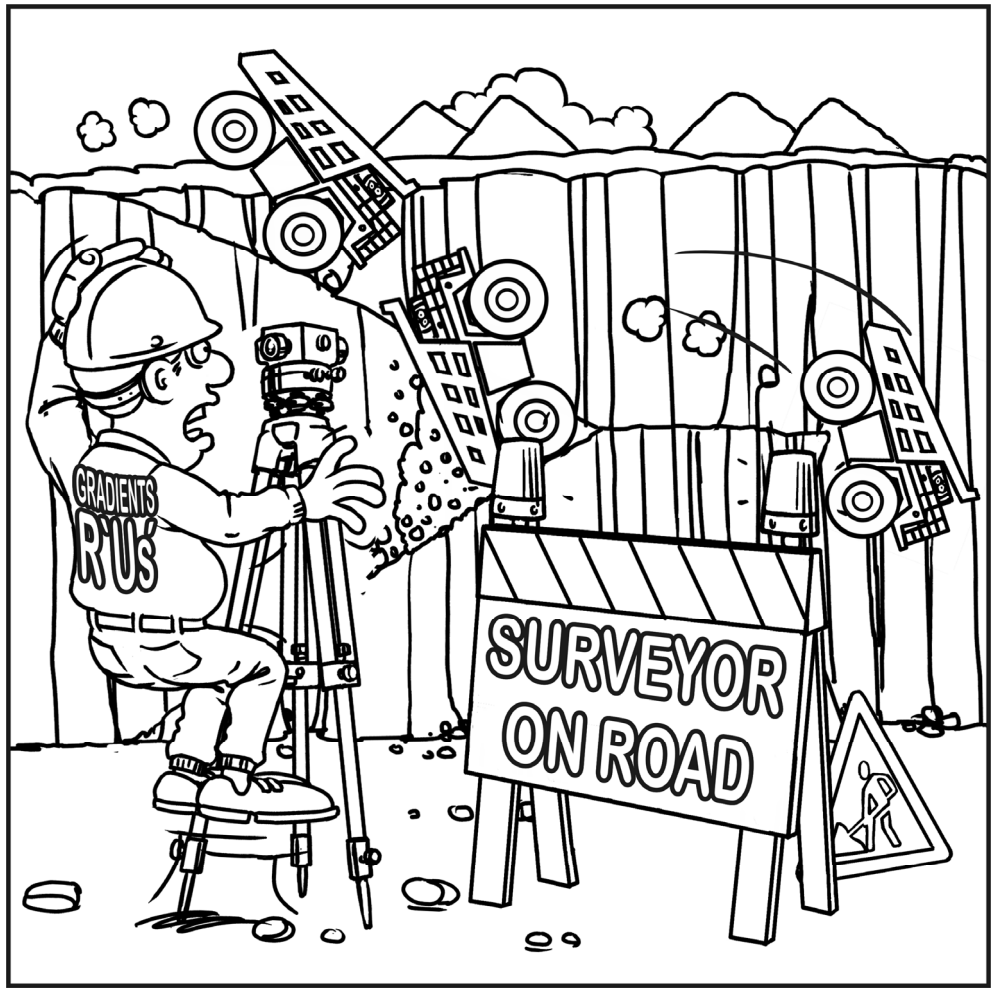
VELOCITY10

THE CARTESIAN PLANE

The Cartesian Plane



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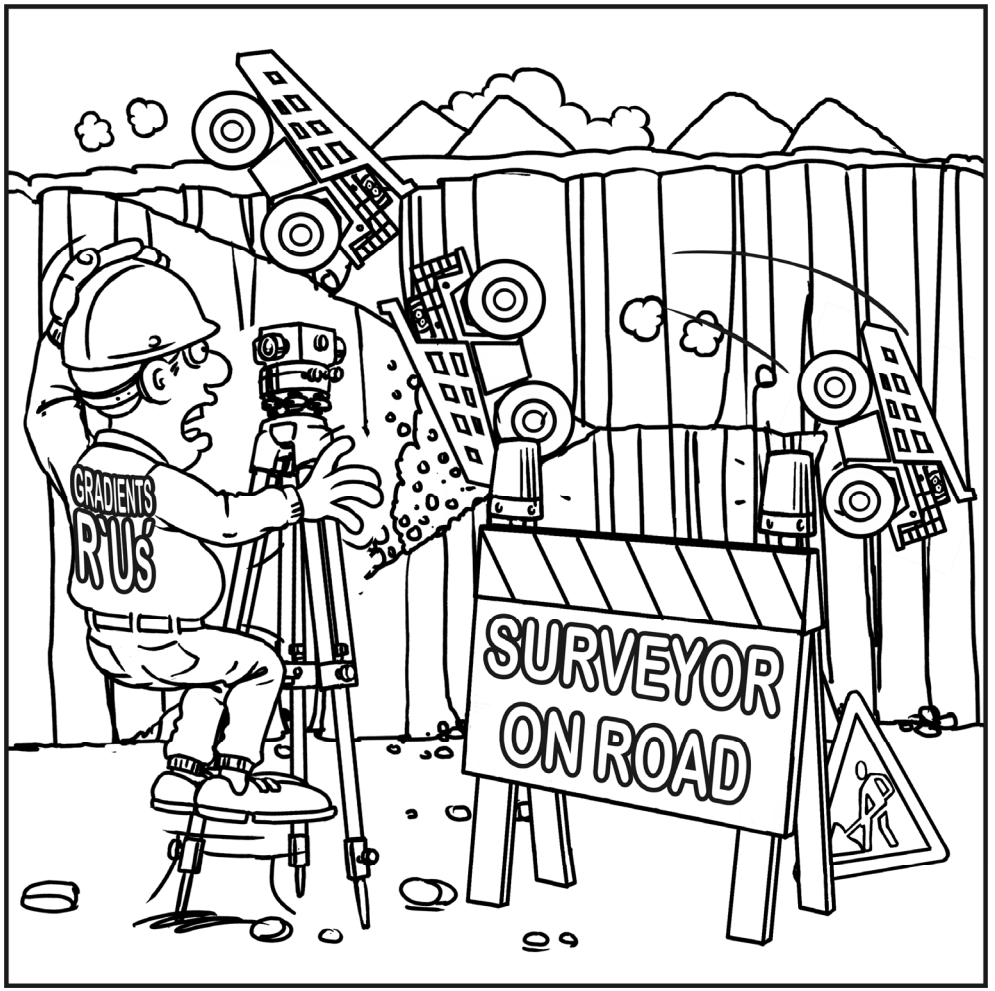
The Cartesian Plane



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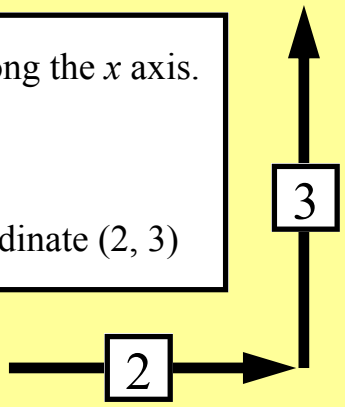
Cartesian Plane - Plotting Points - Positive Quadrant

This sheet involves the plotting of Cartesian co-ordinates. When plotting points on a number plane you are given 2 numbers, referred to as an ordered pair. The first number tells you how much you move across and the second number tells you how much you move up or down. This sheet only moves across to the right and up, negative numbers (not on this sheet) move to the left and down.

Move across first along the *x* axis.

Then move up.

Eg. To plot the co-ordinate (2, 3)



Note that the plane consists of an *x*-axis (horizontal or across) and a *y*-axis which is vertical (up and down). The plural of axis is axes (pronounced ak-seas). The co-ordinate (0, 0) is commonly referred to as the 'origin', the place where measurement starts from. Teachers often ask for the co-ordinates of the origin.

The first column asks you to locate the points and write in their co-ordinates. This is done by opening a bracket writing the *x* co-ordinate, writing a comma, then the *y* co-ordinate and close bracket. You should always place the co-ordinates in brackets.

The second column asks you to plot points. Once the group of points are plotted draw a line between points (in alphabetical order) to form a shape. Then write in the name of the shape plotted in the space provided.

The second sheet uses your skills in plotting points from the previous sheet. The series of points makes a pair of animals when lines are joined between the points. The way you attempt this exercise is, for the first animal:

- Plot one point at a time and then draw a line between it and the previous point. Don't try to plot all the points and then draw the lines afterwards as the drawing is too complicated.
- When you reach stop, restart at the new position and start again, DON'T JOIN THE POINTS BETWEEN WHERE YOU STOPPED AND WHERE YOU RESTARTED.

For the next animal follow the same process except use 2 different colours.

Cartesian Plane - Plotting Points - Positive Quadrant (Sheet 1)

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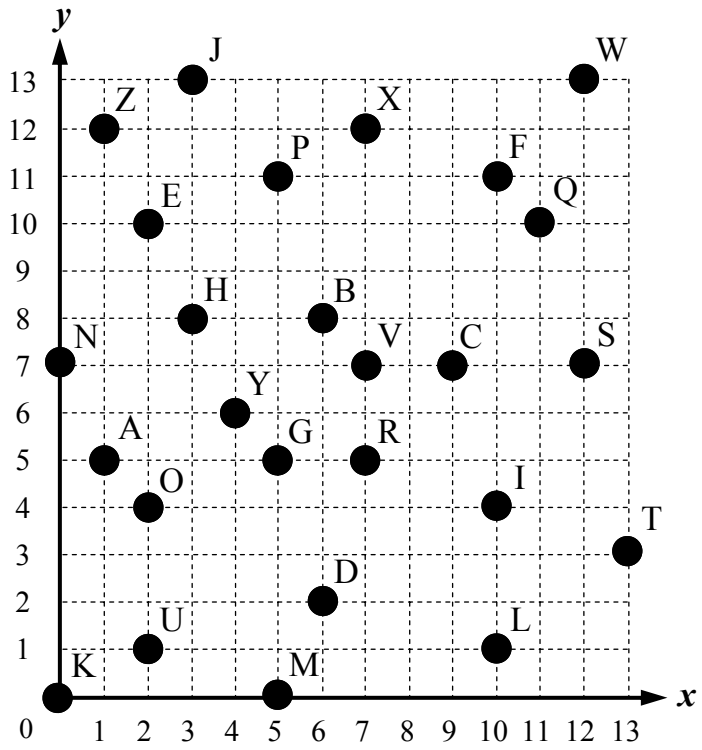
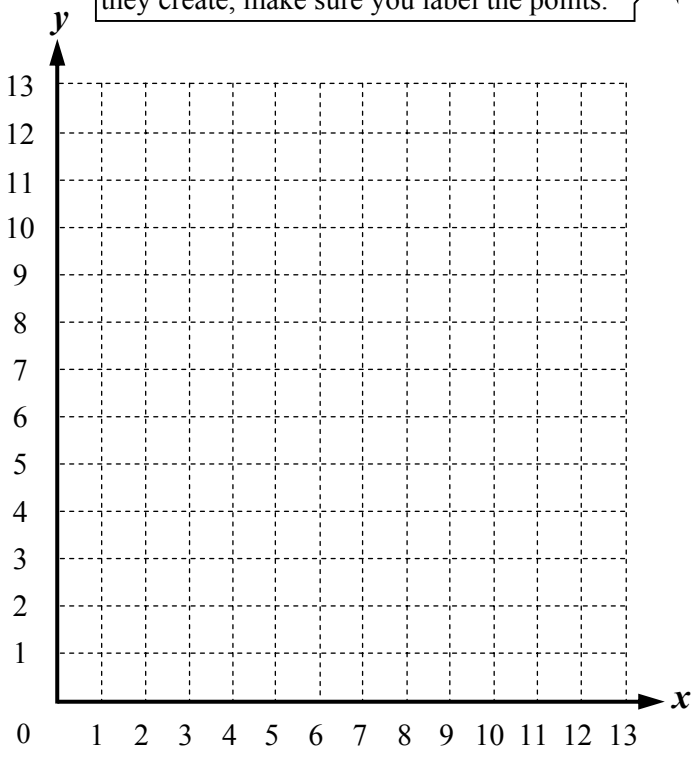
Give the co-ordinates for the following points, place them in brackets separated by a comma



1	Point A (,)	14	Point N
2	Point B (,)	15	Point O
3	Point C	16	Point P
4	Point D	17	Point Q
5	Point E	18	Point R
6	Point F	19	Point S
7	Point G	20	Point T
8	Point H	21	Point U
9	Point I	22	Point V
10	Point J	23	Point W
11	Point K	24	Point X
12	Point L	25	Point Y
13	Point M	26	Point Z

Place the groups of points given below on the grid, join the points and name the shape they create, make sure you label the points.



27 Point A (10, 4) Point B (11, 2)
Point C (12, 4) Point D (11, 5)
Shape formed: _____

28 Point E (3, 5) Point F (0, 8)
Point G (5, 13) Point H (8, 10)
Shape formed: _____

29 Point J (5, 4) Point K (9, 6)
Point L (7, 8)
Shape formed: _____
Two word description

30 Point M (2, 3) Point N (8, 3)
Point O (6, 0) Point P (0, 0)
Shape formed: _____

31 Point R (10, 9) Point S (13, 13)
Point T (13, 9)
Shape formed: _____
Two or three word description

Cartesian Plane - Drawing Animals - Positive Quadrant (Sheet 2)

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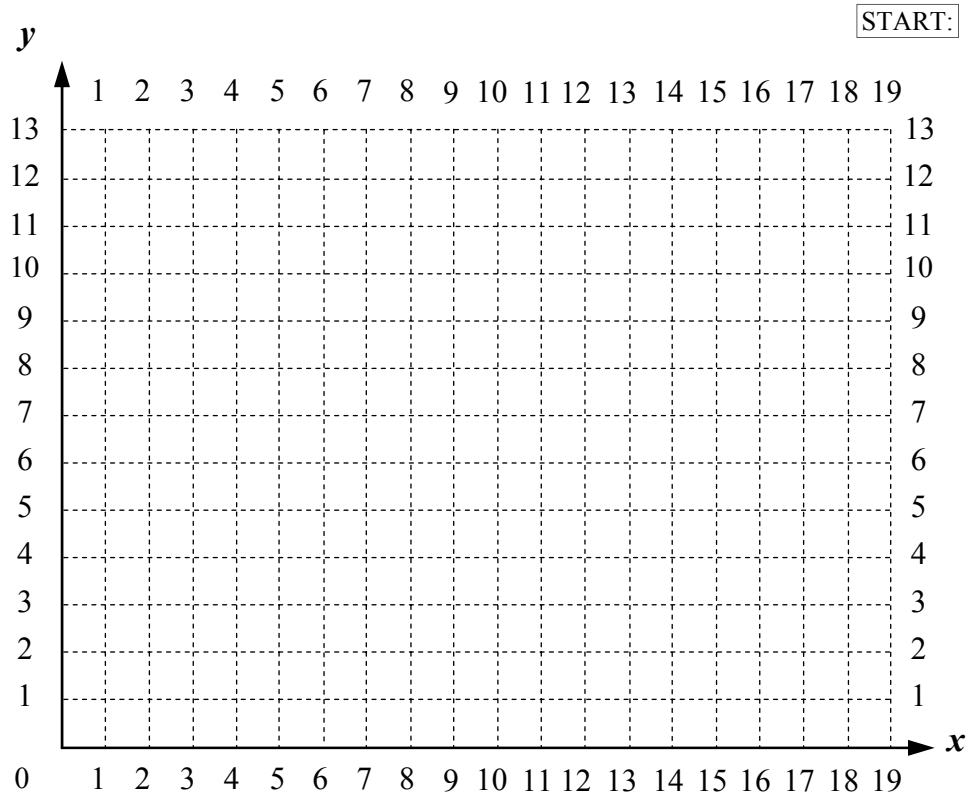
Join the points on the grid with the following co-ordinates and you will find an animal friend who has only one hand.

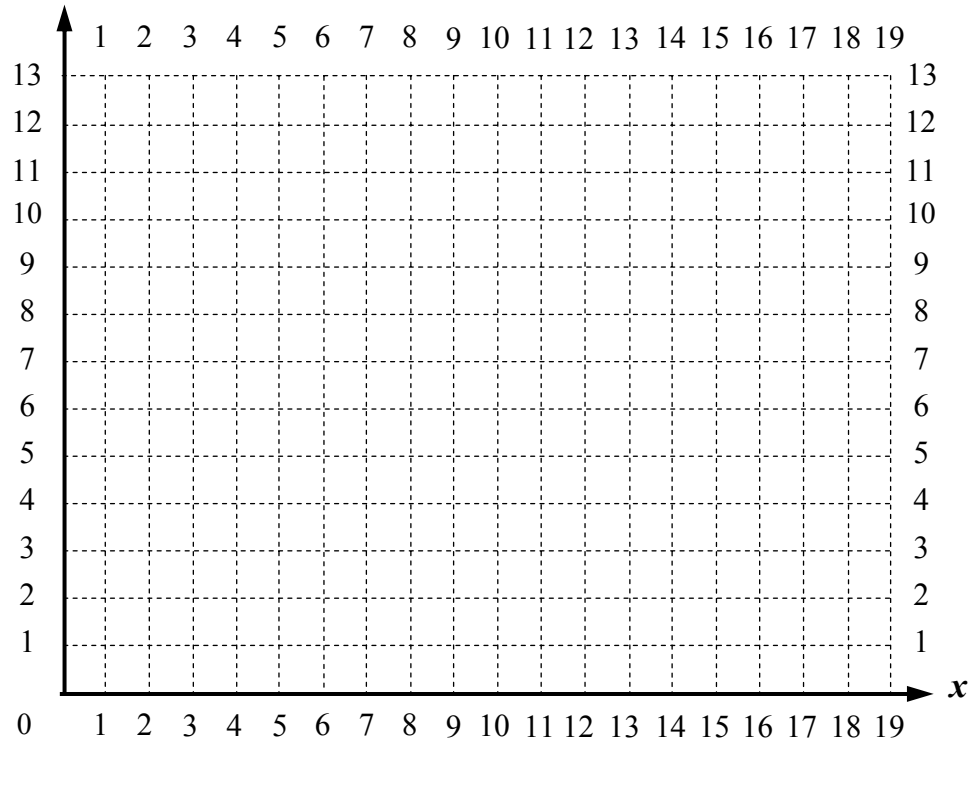


Co-ordinates:

START: (2, 12) , (3, 12) , (4, 11) , (5, 12) ,
(7, 12) , (8, 11) , (9, 12) , (10, 12) ,
(11, 11) , (11, 6) , (10, 3) , (9, 3) ,
(8, 7) , (8, 5) , (7, 7) , (7, 3) ,
(6, 2) , (4, 2) , (4, 3) , (5, 3) ,
(6, 4) , (5, 7) , (4, 5) , (4, 7) ,
(3, 3) , (2, 3) , (1, 6) , (1, 11) ,
(2, 12) STOP!

START:
(11, 10) , (12, 11) , (16, 12) , (18, 10) ,
(19, 7) , (18, 9) , (18, 3) , (15, 3) ,
(16, 4) , (16, 6) , (14, 5) , (11, 5) ,
(11, 4) , (13, 4) , (13, 1) , (12, 2) ,
(9, 2) , (8, 3) , (7, 6) , STOP!

Join the points and this time you will find a friend with which you will have to be very patient.



Co-ordinates:

START: (1, 11) , (2, 10) , (2, 9) , (1, 8) ,
(1, 7) , (2, 6) , (2, 5) , (3, 3) ,
(5, 1) , (7, 0) , (13, 0) , (16, 3) ,
(17, 5) , (15, 3) , (12, 2) , (8, 2) ,
(6, 3) , (4, 5) , (3, 6) , (4, 7) ,
(4, 8) , (3, 9) , (3, 10) , (4, 11) ,
STOP!

START:
(11, 6) , (12, 6) , (11, 7) , (10, 6) ,
(11, 5) , (12, 5) , (14, 6) , (14, 7) ,
(12, 9) , (10, 9) , (8, 7) , (8, 5) ,
(10, 3) , (12, 3) , (14, 4) , (15, 6) ,
(15, 7) , (14, 9) , (13, 10) , (10, 10) ,
(8, 9) , (7, 7) , (8, 3) , (11, 2) ,
(12, 2) , (15, 3) , (17, 6) , (17, 7) ,
(15, 11) , (12, 12) , (10, 12) , (7, 11) ,
(5, 9) , (4, 6) , (4, 5) , STOP!

Cartesian Plane - Plotting Points - Positive Quadrant (Sheet 1)

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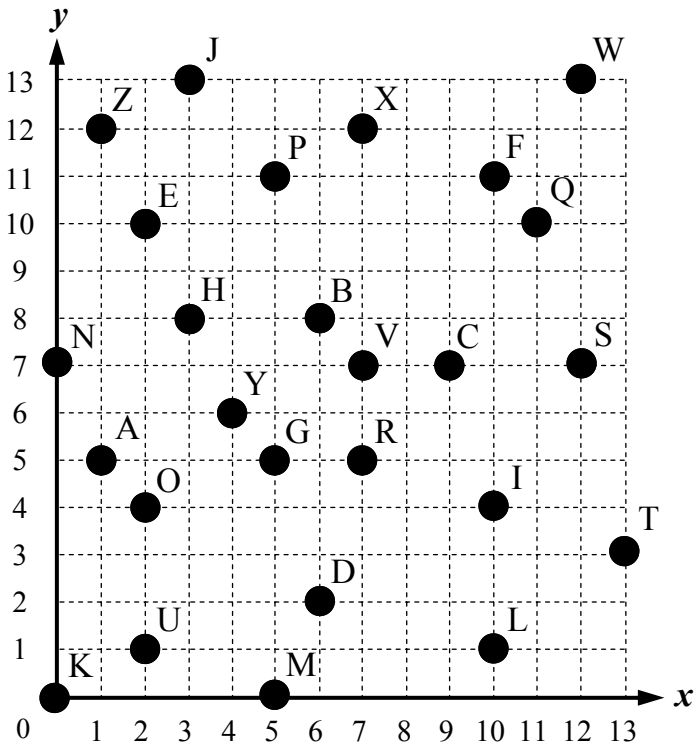
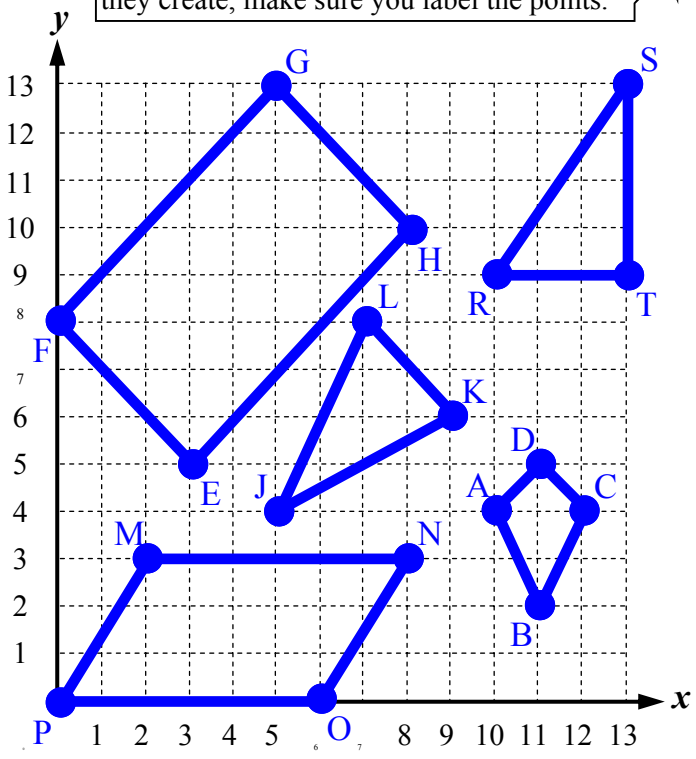
Give the co-ordinates for the following points, place them in brackets separated by a comma



1	Point A	(1, 5)	14	Point N	(0, 7)
2	Point B	(6, 8)	15	Point O	(2, 4)
3	Point C	(9, 7)	16	Point P	(5, 11)
4	Point D	(6, 2)	17	Point Q	(11, 10)
5	Point E	(2, 10)	18	Point R	(7, 5)
6	Point F	(10, 11)	19	Point S	(12, 7)
7	Point G	(5, 5)	20	Point T	(13, 3)
8	Point H	(3, 8)	21	Point U	(2, 1)
9	Point I	(10, 4)	22	Point V	(7, 7)
10	Point J	(3, 13)	23	Point W	(12, 13)
11	Point K	(0, 0)	24	Point X	(7, 12)
12	Point L	(10, 1)	25	Point Y	(4, 6)
13	Point M	(5, 0)	26	Point Z	(1, 12)

Place the groups of points given below on the grid, join the points and name the shape they create, make sure you label the points.



27 Point A (10, 4) Point B (11, 2)
Point C (12, 4) Point D (11, 5)
Shape formed: Kite

28 Point E (3, 5) Point F (0, 8)
Point G (5, 13) Point H (8, 10)
Shape formed: Rectangle

29 Point J (5, 4) Point K (9, 6)
Point L (7, 8)
Shape formed: Isosceles Triangle
Two word description

30 Point M (2, 3) Point N (8, 3)
Point O (6, 0) Point P (0, 0)
Shape formed: Parallelogram

31 Point R (10, 9) Point S (13, 13)
Point T (13, 9)
Shape formed: Right (Angled) Triangle
Two or three word description

Cartesian Plane - Drawing Animals - Positive Quadrant (Sheet 2)

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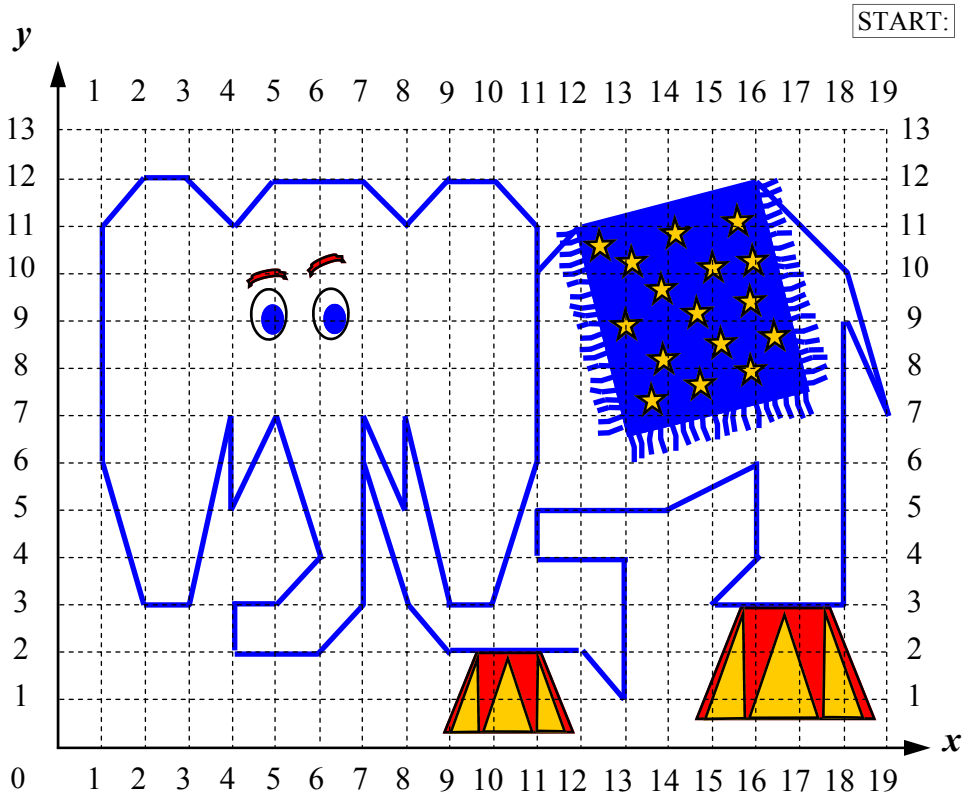
Join the points on the grid with the following co-ordinates and you will find an animal friend who has only one hand.

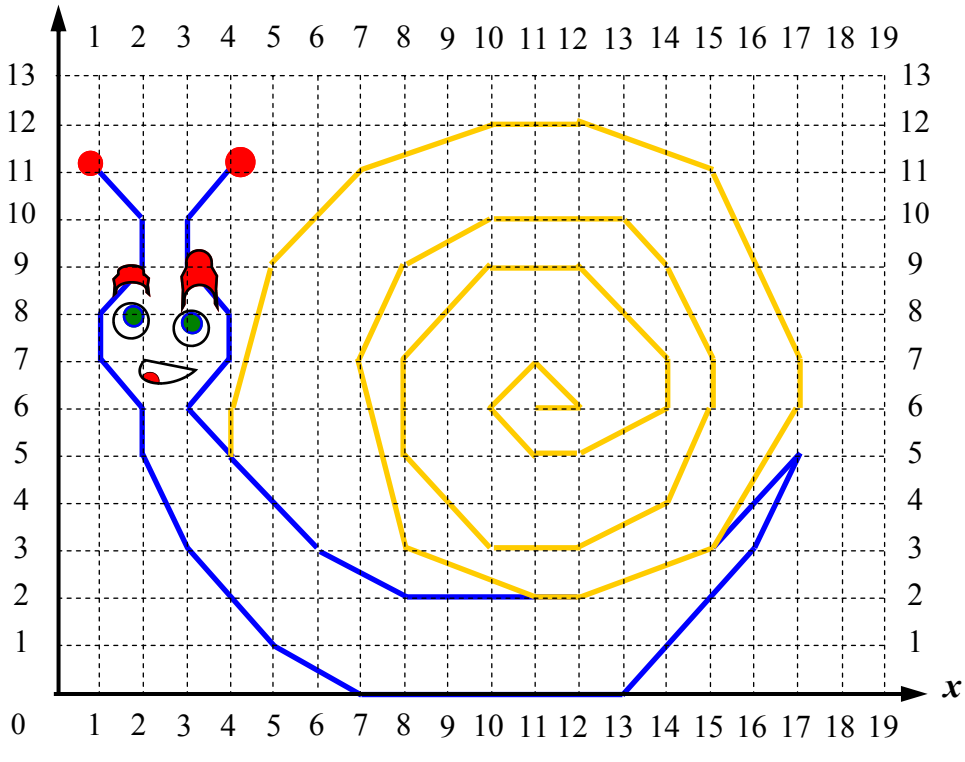


Co-ordinates:

START: (2, 12) , (3, 12) , (4, 11) , (5, 12) ,
(7, 12) , (8, 11) , (9, 12) , (10, 12) ,
(11, 11) , (11, 6) , (10, 3) , (9, 3) ,
(8, 7) , (8, 5) , (7, 7) , (7, 3) ,
(6, 2) , (4, 2) , (4, 3) , (5, 3) ,
(6, 4) , (5, 7) , (4, 5) , (4, 7) ,
(3, 3) , (2, 3) , (1, 6) , (1, 11) ,
(2, 12) STOP!

START:
(11, 10) , (12, 11) , (16, 12) , (18, 10) ,
(19, 7) , (18, 9) , (18, 3) , (15, 3) ,
(16, 4) , (16, 6) , (14, 5) , (11, 5) ,
(11, 4) , (13, 4) , (13, 1) , (12, 2) ,
(9, 2) , (8, 3) , (7, 6) , STOP!

Join the points and this time you will find a friend with which you will have to be very patient.



Co-ordinates:

START: (1, 11) , (2, 10) , (2, 9) , (1, 8) ,
(1, 7) , (2, 6) , (2, 5) , (3, 3) ,
(5, 1) , (7, 0) , (13, 0) , (16, 3) ,
(17, 5) , (15, 3) , (12, 2) , (8, 2) ,
(6, 3) , (4, 5) , (3, 6) , (4, 7) ,
(4, 8) , (3, 9) , (3, 10) , (4, 11) ,
STOP!

START:
(11, 6) , (12, 6) , (11, 7) , (10, 6) ,
(11, 5) , (12, 5) , (14, 6) , (14, 7) ,
(12, 9) , (10, 9) , (8, 7) , (8, 5) ,
(10, 3) , (12, 3) , (14, 4) , (15, 6) ,
(15, 7) , (14, 9) , (13, 10) , (10, 10) ,
(8, 9) , (7, 7) , (8, 3) , (11, 2) ,
(12, 2) , (15, 3) , (17, 6) , (17, 7) ,
(15, 11) , (12, 12) , (10, 12) , (7, 11) ,
(5, 9) , (4, 6) , (4, 5) , STOP!

Cartesian Plane - Plotting Points - Positive Quadrant (Homework Strip)

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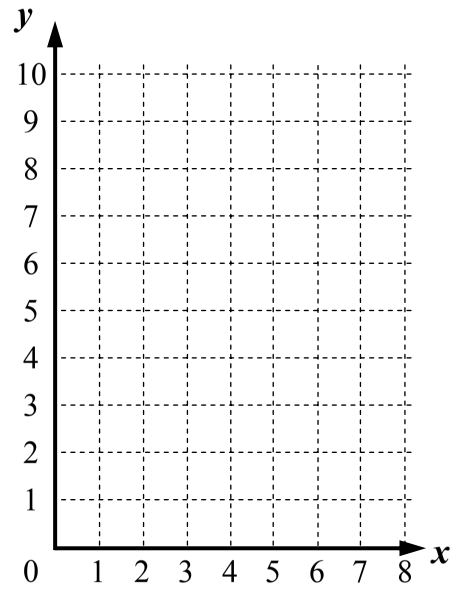
Date Due: _____

Plot and join the points, name the shape



1 (3, 3) ; (3, 9) ; (7, 9) ; (7, 3) .

Shape formed: _____

2 (8, 7) ; (1, 7) ; (1, 10) ; (5, 10) .

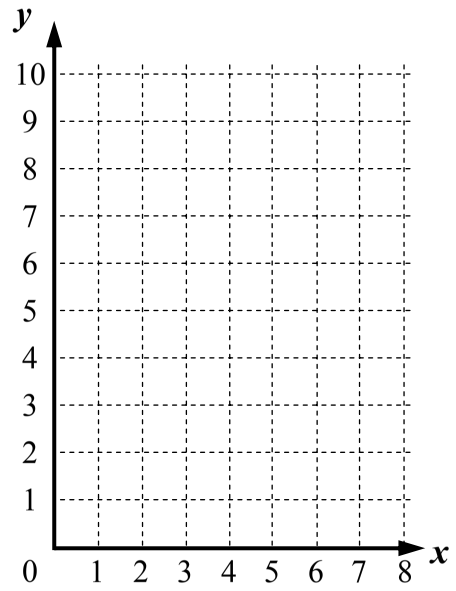
Shape formed: _____

3 (5, 5) ; (6, 3) ; (5, 1) ; (2, 1) ; (1, 3) ; (2, 5) .

Shape formed: _____

Date Due: _____

Plot and join the points, name the shape



1 (3, 3) ; (3, 9) ; (7, 9) ; (7, 3) .

Shape formed: _____

2 (8, 7) ; (1, 7) ; (1, 10) ; (5, 10) .

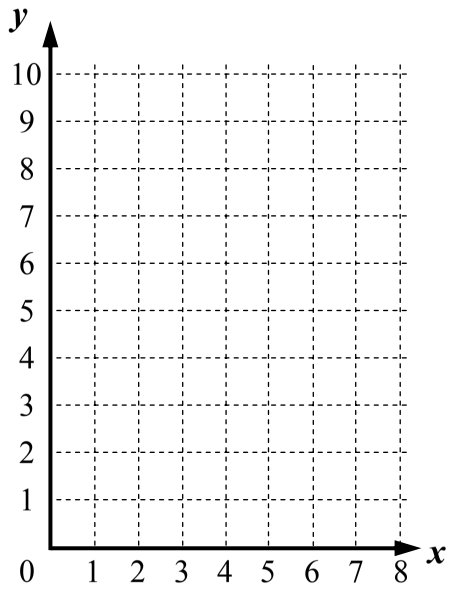
Shape formed: _____

3 (5, 5) ; (6, 3) ; (5, 1) ; (2, 1) ; (1, 3) ; (2, 5) .

Shape formed: _____

Date Due: _____

Plot and join the points, name the shape



1 (3, 3) ; (3, 9) ; (7, 9) ; (7, 3) .

Shape formed: _____

2 (8, 7) ; (1, 7) ; (1, 10) ; (5, 10) .

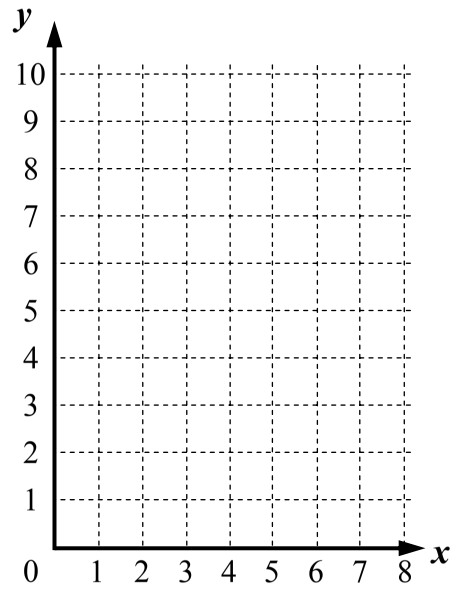
Shape formed: _____

3 (5, 5) ; (6, 3) ; (5, 1) ; (2, 1) ; (1, 3) ; (2, 5) .

Shape formed: _____

Date Due: _____

Plot and join the points, name the shape



1 (3, 3) ; (3, 9) ; (7, 9) ; (7, 3) .

Shape formed: _____

2 (8, 7) ; (1, 7) ; (1, 10) ; (5, 10) .

Shape formed: _____

3 (5, 5) ; (6, 3) ; (5, 1) ; (2, 1) ; (1, 3) ; (2, 5) .

Shape formed: _____

Cartesian Plane - Plotting Points - Positive Quadrant (Homework Strip)

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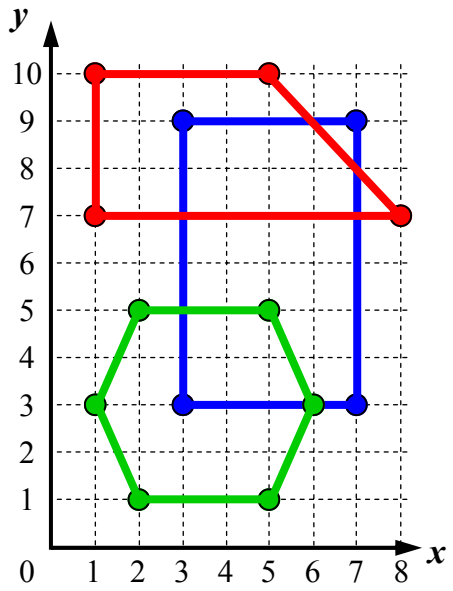
Date Due: _____

Plot and join the points, name the shape



1 (3, 3) ; (3, 9) ; (7, 9) ; (7, 3) .

Shape formed: Rectangle

2 (8, 7) ; (1, 7) ; (1, 10) ; (5, 10) .

Shape formed: Trapezium

3 (5, 5) ; (6, 3) ; (5, 1) ; (2, 1) ; (1, 3) ; (2, 5) .

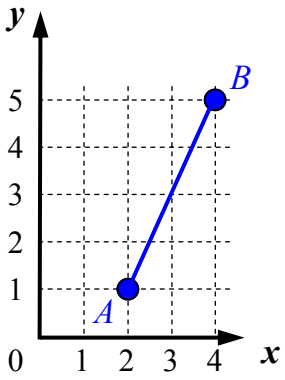
Shape formed: Irregular Hexagon

Cartesian Plane - Midpoint - Positive Quadrant

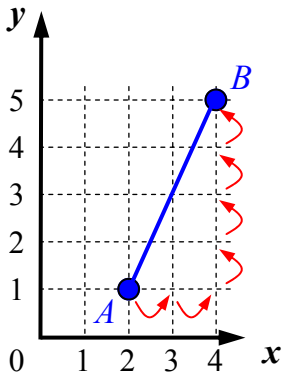
If you draw a line, halfway along that line is the midpoint. There are two common ways of finding the location of the midpoint. You can measure it's location on a number plane 'Graphically', or you can calculate its location 'Analytically'.

Graphical Solution

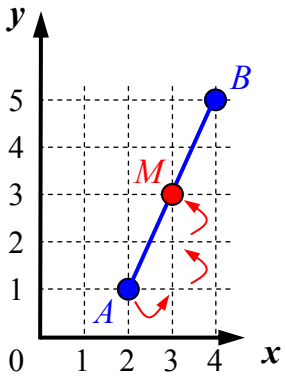
Example: Find the midpoint M on the interval joining A (2, 1) and B (4, 5)



Plot A and B and draw the interval AB



Count the 'hops' and halve them. Horizontal is 2 hops, so midpoint is 1 hop past the 2. So it is 3. Vertical is 4 hops, so midpoint is 2 hops above the 1. So it is 3 also.



Plot the midpoint and label it M.
There is a space in the question to record its coordinates, for the M above, it is (3, 3).

Analytical Method

It may be that the points aren't graphed, or the values are that large that graphing them isn't feasible. Or you just prefer using numbers, either way you can find the midpoint using this formula:

$$M(\bar{x}, \bar{y}) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Where one point is (x_1, y_1), and the other point is (x_2, y_2).

What does this mean? It means that you add the x-values and divide them by 2, for the x-coordinate of the midpoint. Then repeat for the y-values, for the y-coordinate of the midpoint. There is an example at the bottom of Column 1 on Sheet 2.

Cartesian Plane - Midpoint (Graphical) - Positive Quadrant (Sheet 1)

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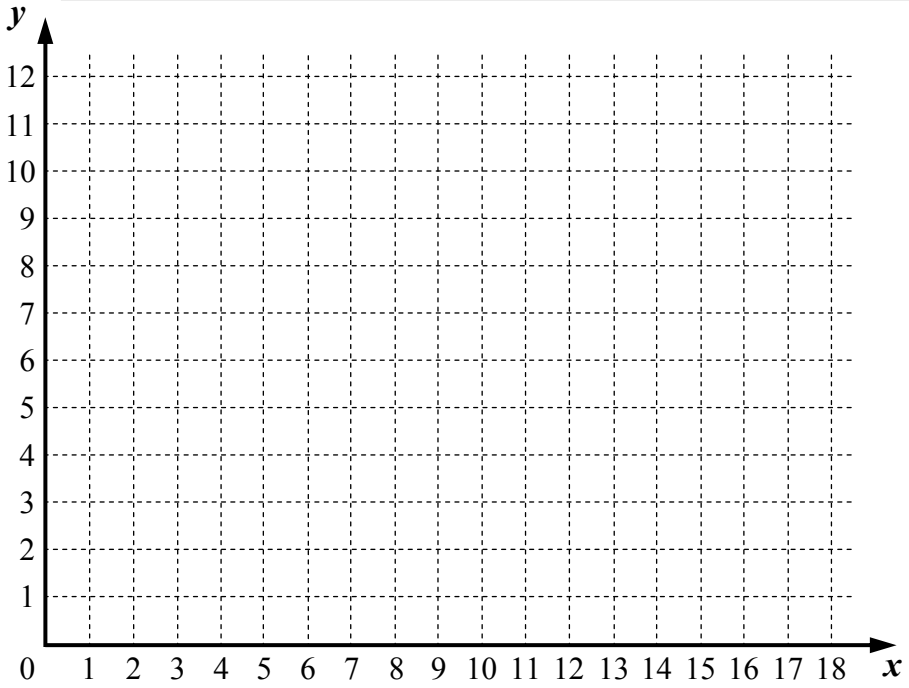
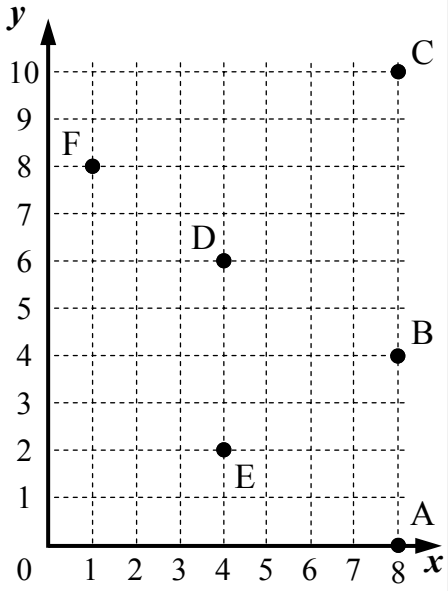
Plot the points and use a ruler to rule a line between the two points and find the midpoint. Plot the midpoint on the line record its co-ordinates. Write letters in pencil, as you may need to move them later!



This time the points are plotted, rule the line, find the midpoint and record all coordinates.



13 Construct DC and find 'M'

D: (☐ , ☐) C: (☐ , ☐)

Midpoint M: (☐ , ☐)

14 Construct FE and find 'M'

F: (☐ , ☐) E: (☐ , ☐)

Midpoint M: (☐ , ☐)

15 Construct FC and find 'M'

F: (☐ , ☐) C: (☐ , ☐)

Midpoint M: (☐ , ☐)

16 Construct BD and find 'M'

B: (☐ , ☐) D: (☐ , ☐)

Midpoint M: (☐ , ☐)

17 Construct AD and find 'M'

A: (☐ , ☐) D: (☐ , ☐)

Midpoint M: (☐ , ☐)

Steps: Plot the points on the number plane.
Rule a line in between the two points.
Plot the midpoint, call it 'M'.
Write the co-ordinate for the midpoint.

1 A (1, 12) and B (3, 4).

Midpoint: (☐ , ☐)

Label the midpoint 'M' on the number plane

2 Y (18, 10) and X (6, 12).

Midpoint: (☐ , ☐)

3 L (6, 11) and N (6, 1).

Midpoint: _____

4 E (0, 4) and F (6, 0).

Midpoint: _____

5 Q (15, 9) and R (5, 3).

Midpoint: _____

'QR' will cross previous line

6 J (9, 7) and K (17, 7).

Midpoint: _____

It is possible to have '½' in a co-ordinate. These all do! Approach these the same way.

Use a different colour for these lines

7 T (18, 4) and B (3, 4).

Midpoint: _____

8 C (10, 0) and D (16, 3).

Midpoint: _____

9 L (6, 11) and J (9, 7).

Midpoint: _____

10 T (18, 4) and K (17, 7).

Midpoint: _____

11 B (3, 4) and L (6, 11).

Midpoint: _____

12 V (10, 10) and Q (15, 9).

Midpoint: _____

Cartesian Plane - Midpoint (Analytical) - Positive Quadrant (Sheet 2)

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Find the average of these two numbers. Add them, press '=' and then divide '÷' by 2. $\bar{x}$ is the mean (pronounced *x*-bar).

1 22 and 38

$$\bar{x} = \frac{\square + \square}{2} = \square$$

Calc: 2 2 + 3 8 = ÷ 2 =

2 26 and 6

$$\bar{x} = \frac{\square + \square}{2} = \square$$

3 5 and 33

$$\bar{x} =$$

4 14 and 21

$$\bar{x} =$$

With halves use '½' not '.5'

Find the midpoint of the interval that joins these two points. Find two averages.

Example

Find the midpoint of the interval joining (2, 7) and (14, 15).

x_1 y_1 x_2 y_2

$$\bar{x} = \frac{2 + 14}{2} = 8$$

$$\bar{y} = \frac{7 + 15}{2} = 11$$

$$M(\bar{x}, \bar{y}) = (8, 11)$$

5 (5, 2) and (23, 14).

$$\bar{x} = \frac{\square + \square}{2} = \square$$

$$\bar{y} = \frac{\square + \square}{2} = \square$$

$$M(\bar{x}, \bar{y}) = (\square, \square)$$

6 (1, 14) and (19, 22).

$$\bar{x} = \frac{\square + \square}{2} = \square$$

$$\bar{y} = \frac{\square + \square}{2} = \square$$

$$M(\bar{x}, \bar{y}) = (\square, \square)$$

7 (14, 2) and (8, 6).

$$\bar{x} =$$

$$\bar{y} =$$

$$M(\bar{x}, \bar{y}) = (\square, \square)$$

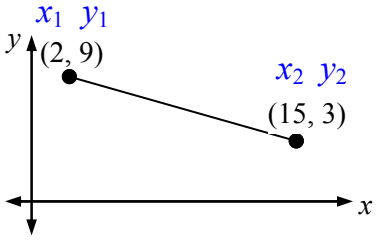
8 (9, 17) and (3, 8).

9 (11, 2) and (12, 9).

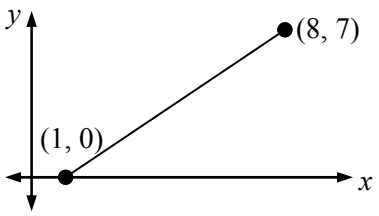
10 (6, 0) and (11, 13).

Use the same method, but this time you have to get your information from a sketch.

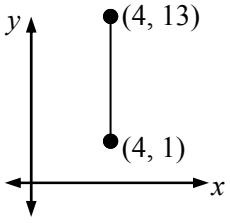
11



12



13



Cartesian Plane - Midpoint (Graphical) - Positive Quadrant (Sheet 1)

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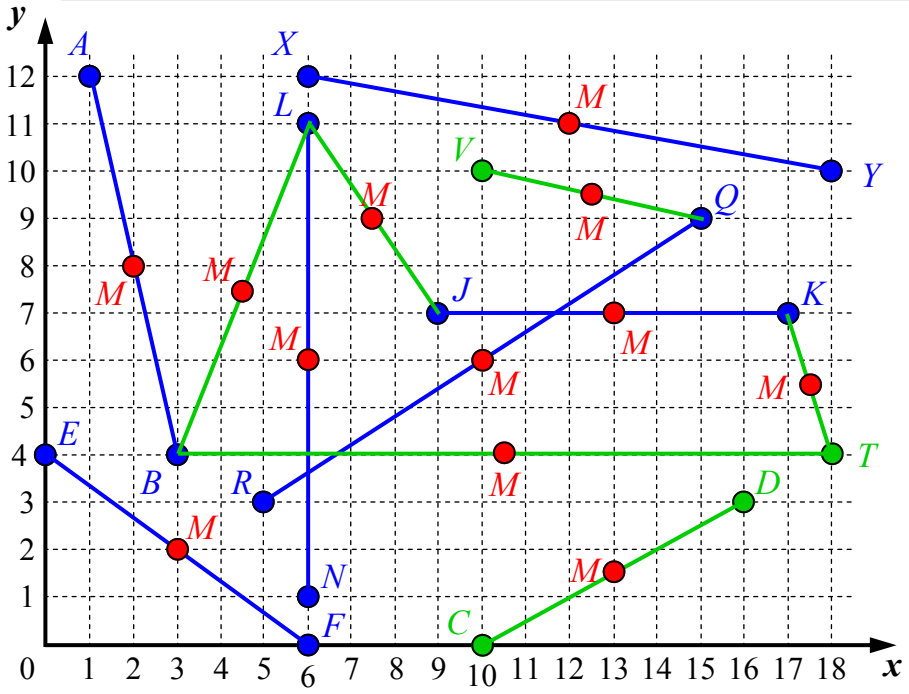
Plot the points and use a ruler to rule a line between the two points and find the midpoint. Plot the midpoint on the line record its co-ordinates. Write letters in pencil, as you may need to move them later!



Steps: Plot the points on the number plane.
Rule a line in between the two points.
Plot the midpoint, call it 'M'.
Write the co-ordinate for the midpoint.

1 A (1, 12) and B (3, 4).

Midpoint: (2 , 8)

Label the midpoint 'M' on the number plane

2 Y (18, 10) and X (6, 12).

Midpoint: (12 , 11)

3 L (6, 11) and N (6, 1).

Midpoint: (6, 6)

4 E (0, 4) and F (6, 0).

Midpoint: (3, 2)

5 Q (15, 9) and R (5, 3).

Midpoint: (10, 6)

'QR' will cross previous line

6 J (9, 7) and K (17, 7).

Midpoint: (13, 7)

It is possible to have '½' in a co-ordinate. These all do! Approach these the same way.

Use a different colour for these lines

7 T (18, 4) and B (3, 4).

Midpoint: (10½, 4)

8 C (10, 0) and D (16, 3).

Midpoint: (13, 1½)

9 L (6, 11) and J (9, 7).

Midpoint: (7½, 9)

10 T (18, 4) and K (17, 7).

Midpoint: (17½, 5½)

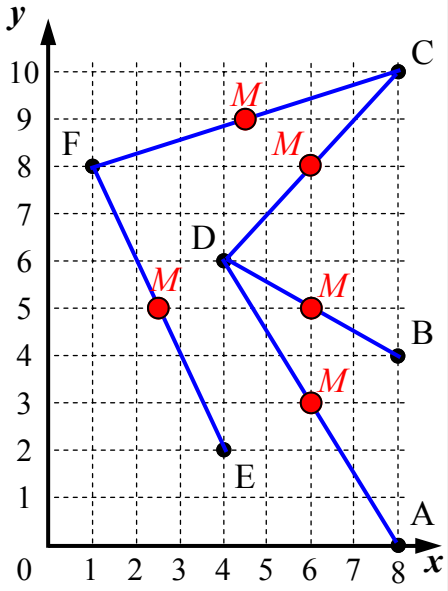
11 B (3, 4) and L (6, 11).

Midpoint: (4½, 7½)

12 V (10, 10) and Q (15, 9).

Midpoint: (12½, 9½)

This time the points are plotted, rule the line, find the midpoint and record all coordinates.



13 Construct DC and find 'M'

D: (4 , 6) C: (8 , 10)

Midpoint M: (6 , 8)

14 Construct FE and find 'M'

F: (1 , 8) E: (4 , 2)

Midpoint M: (2½ , 5)

15 Construct FC and find 'M'

F: (1 , 8) C: (8 , 10)

Midpoint M: (4½ , 9)

16 Construct BD and find 'M'

B: (8 , 4) D: (4 , 6)

Midpoint M: (6 , 5)

17 Construct AD and find 'M'

A: (8 , 0) D: (4 , 6)

Midpoint M: (6 , 3)

Cartesian Plane - Midpoint (Analytical) - Positive Quadrant (Sheet 2)

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Find the average of these two numbers. Add them, press '=' and then divide '÷' by 2. $\bar{x}$ is the mean (pronounced *x*-bar).

1 22 and 38

$$\bar{x} = \frac{22 + 38}{2} = 30$$

Calc: 2 2 + 3 8 = ÷ 2 =

2 26 and 6

$$\bar{x} = \frac{26 + 6}{2} = 16$$

3 5 and 33

$$\bar{x} = \frac{5 + 33}{2} = 19$$

4 14 and 21

$$\bar{x} = \frac{14 + 21}{2} = 17\frac{1}{2}$$

With halves use '½' not '.5'

Find the midpoint of the interval that joins these two points. Find two averages.

Example

Find the midpoint of the interval joining (2, 7) and (14, 15).

$x_1\ y_1 \qquad x_2\ y_2$

$$\bar{x} = \frac{2 + 14}{2} = 8$$

$$\bar{y} = \frac{7 + 15}{2} = 11$$

$$M(\bar{x}, \bar{y}) = (8, 11)$$

5 (5, 2) and (23, 14).

$x_1\ y_1 \qquad x_2\ y_2$

$$\bar{x} = \frac{5 + 23}{2} = 14$$

$$\bar{y} = \frac{2 + 14}{2} = 8$$

$$M(\bar{x}, \bar{y}) = (14, 8)$$

6 (1, 14) and (19, 22).

$x_1\ y_1 \qquad x_2\ y_2$

$$\bar{x} = \frac{1 + 19}{2} = 10$$

$$\bar{y} = \frac{14 + 22}{2} = 18$$

$$M(\bar{x}, \bar{y}) = (10, 18)$$

7 (14, 2) and (8, 6).

$x_1\ y_1 \qquad x_2\ y_2$

$$\bar{x} = \frac{14 + 8}{2} = 11$$

$$\bar{y} = \frac{2 + 6}{2} = 4$$

$$M(\bar{x}, \bar{y}) = (11, 4)$$

8 (9, 17) and (3, 8).

$x_1\ y_1 \qquad x_2\ y_2$

$$\bar{x} = \frac{9 + 3}{2} = 6$$

$$\bar{y} = \frac{17 + 8}{2} = 12\frac{1}{2}$$

$$M(\bar{x}, \bar{y}) = (6, 12\frac{1}{2})$$

9 (11, 2) and (12, 9).

$x_1\ y_1 \qquad x_2\ y_2$

$$\bar{x} = \frac{11 + 12}{2} = 11\frac{1}{2}$$

$$\bar{y} = \frac{2 + 9}{2} = 5\frac{1}{2}$$

$$M(\bar{x}, \bar{y}) = (11\frac{1}{2}, 5\frac{1}{2})$$

10 (6, 0) and (11, 13).

$x_1\ y_1 \qquad x_2\ y_2$

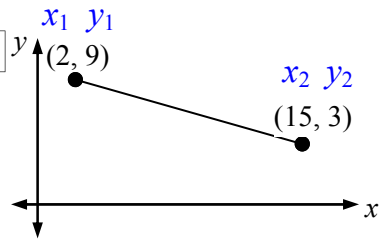
$$\bar{x} = \frac{6 + 11}{2} = 8\frac{1}{2}$$

$$\bar{y} = \frac{0 + 13}{2} = 6\frac{1}{2}$$

$$M(\bar{x}, \bar{y}) = (8\frac{1}{2}, 6\frac{1}{2})$$

Use the same method, but this time you have to get your information from a sketch.

11

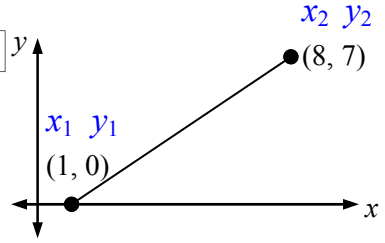


$$\bar{x} = \frac{2 + 15}{2} = 8\frac{1}{2}$$

$$\bar{y} = \frac{9 + 3}{2} = 6$$

$$M(\bar{x}, \bar{y}) = (8\frac{1}{2}, 6)$$

12

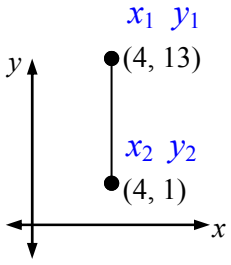


$$\bar{x} = \frac{1 + 8}{2} = 4\frac{1}{2}$$

$$\bar{y} = \frac{0 + 7}{2} = 3\frac{1}{2}$$

$$M(\bar{x}, \bar{y}) = (4\frac{1}{2}, 3\frac{1}{2})$$

13



$$\bar{x} = \frac{4 + 4}{2} = 4$$

$$\bar{y} = \frac{13 + 1}{2} = 7$$

$$M(\bar{x}, \bar{y}) = (4, 7)$$

Cartesian Plane - Midpoint - Positive Quadrant (Homework Strip)

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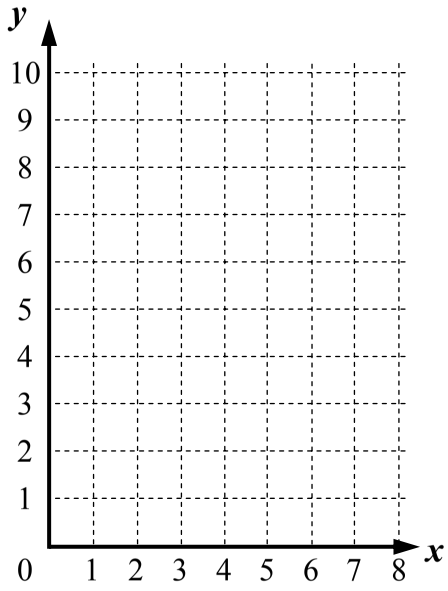
Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 $A\ (0, 10)$ and $B\ (2, 2)$.

Midpoint: (____ , ____)

2 $C\ (8, 3)$ and $D\ (3, 7)$.

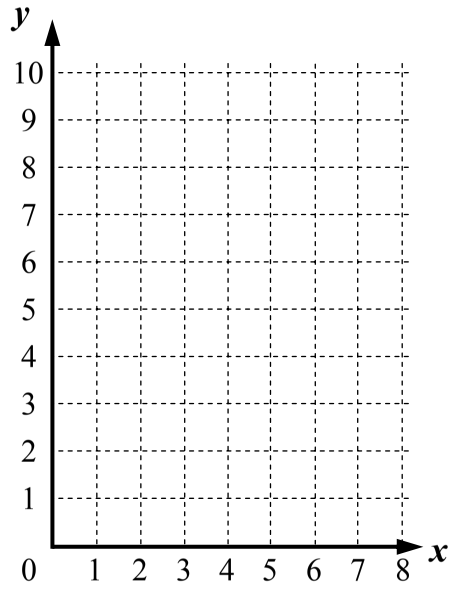
Midpoint: (____ , ____)

3 $E\ (7, 10)$ and $F\ (2, 9)$.

Midpoint: (____ , ____)

Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 $A\ (0, 10)$ and $B\ (2, 2)$.

Midpoint: (____ , ____)

2 $C\ (8, 3)$ and $D\ (3, 7)$.

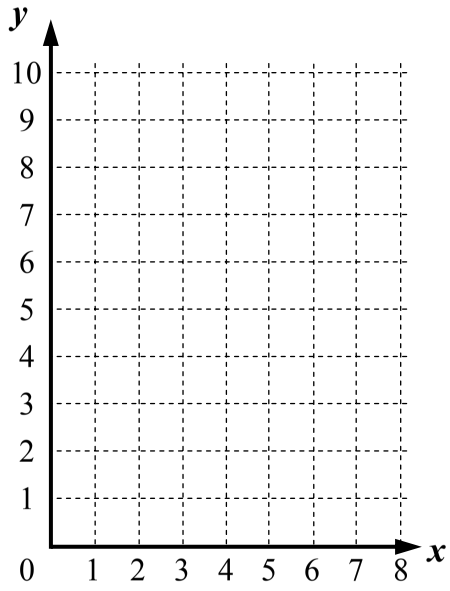
Midpoint: (____ , ____)

3 $E\ (7, 10)$ and $F\ (2, 9)$.

Midpoint: (____ , ____)

Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 $A\ (0, 10)$ and $B\ (2, 2)$.

Midpoint: (____ , ____)

2 $C\ (8, 3)$ and $D\ (3, 7)$.

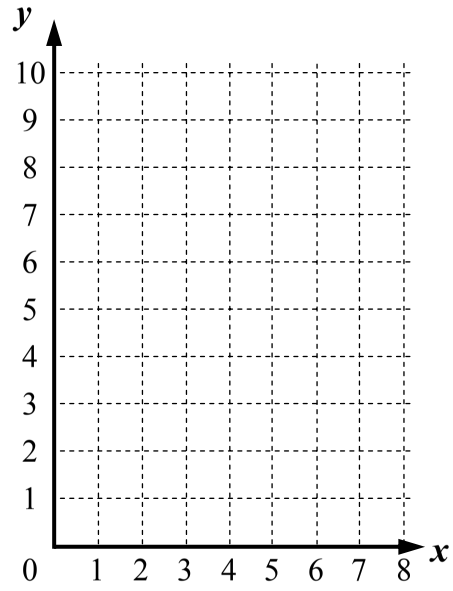
Midpoint: (____ , ____)

3 $E\ (7, 10)$ and $F\ (2, 9)$.

Midpoint: (____ , ____)

Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 $A\ (0, 10)$ and $B\ (2, 2)$.

Midpoint: (____ , ____)

2 $C\ (8, 3)$ and $D\ (3, 7)$.

Midpoint: (____ , ____)

3 $E\ (7, 10)$ and $F\ (2, 9)$.

Midpoint: (____ , ____)

Cartesian Plane - Midpoint - Positive Quadrant (Homework Strip)

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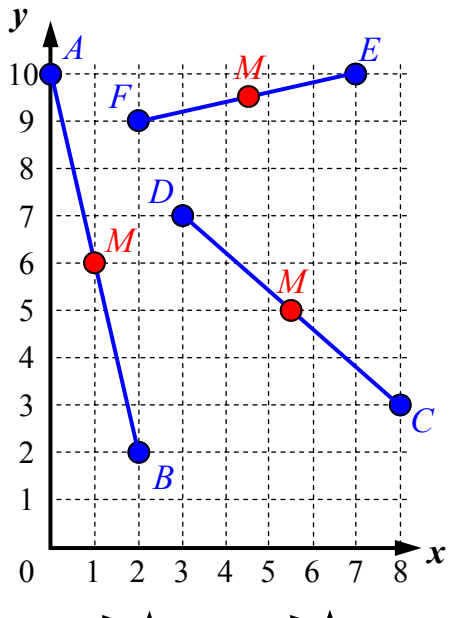
Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 *A* (0, 10) and *B* (2, 2).

Midpoint: (1 , 6)

2 *C* (8, 3) and *D* (3, 7).

Midpoint: (5½ , 5)

3 *E* (7, 10) and *F* (2, 9).

Midpoint: (4½ , 9½)

Cartesian Plane - Plotting Points - All Quadrants

This sheet involves the plotting of Cartesian co-ordinates. When plotting points on a number plane you are given two numbers. The first number tells you how much you move across and the second number tells you how much you move up or down. As the numbers are in order, across first, up/down second, these numbers can be referred to as 'ordered pairs', as their order is important. Positive numbers move across to the right if the first number, negative numbers move to the left if the first number. Positive numbers move up if the second number, negative numbers move down if the second number.

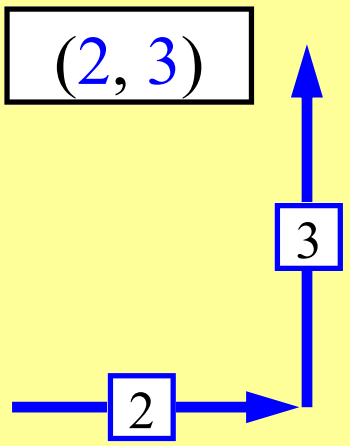
The first column asks you to locate the points and write in their co-ordinates. This is done by opening a bracket writing the *x* co-ordinate, a comma, then the *y* co-ordinate and close bracket. Always place co-ordinates in brackets.

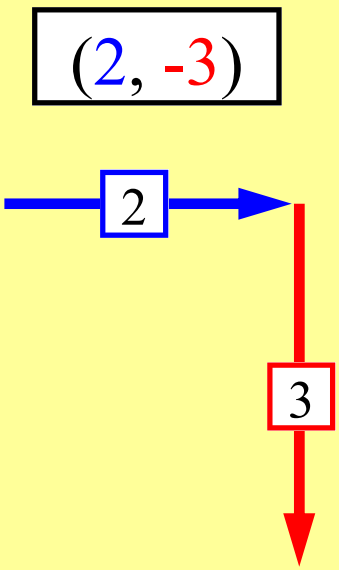
The second column asks you to plot points. Draw filled in circles at the given location and label them with the letter supplied in each question.

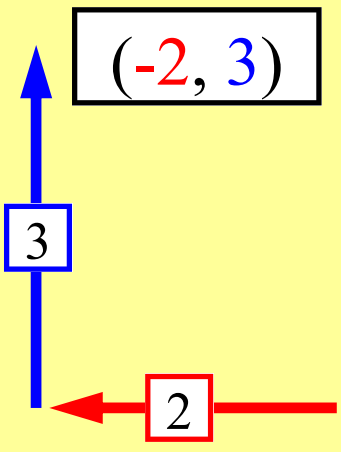
Once you plot the point record down which quadrant it is in. Quadrants start with the 1st Quadrant (top right) and then moving anti-clockwise, are called II (2^{nd}), III (3^{rd}) and IV (4^{th}). If the point is on the axis then record it by filling in the oval around the word 'Axis'.

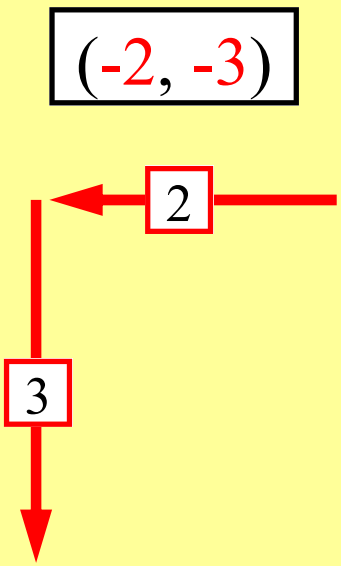
Move across first along the *x* axis.
Negative to the left, Positive to the right.

Then move up or down in the *y* direction.
Negative is down, Positive is up.









Cartesian Plane - Plotting Points - All Quadrants (Sheet 1)

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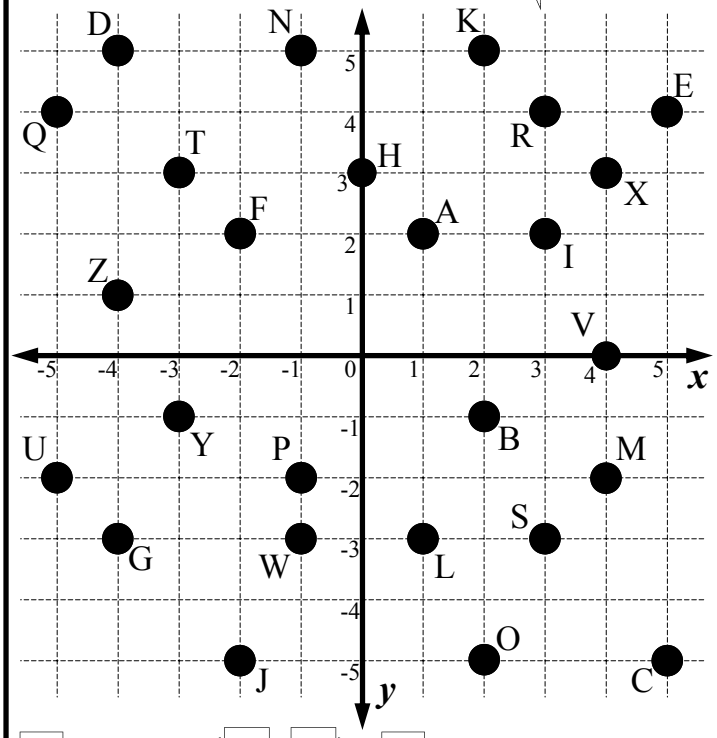
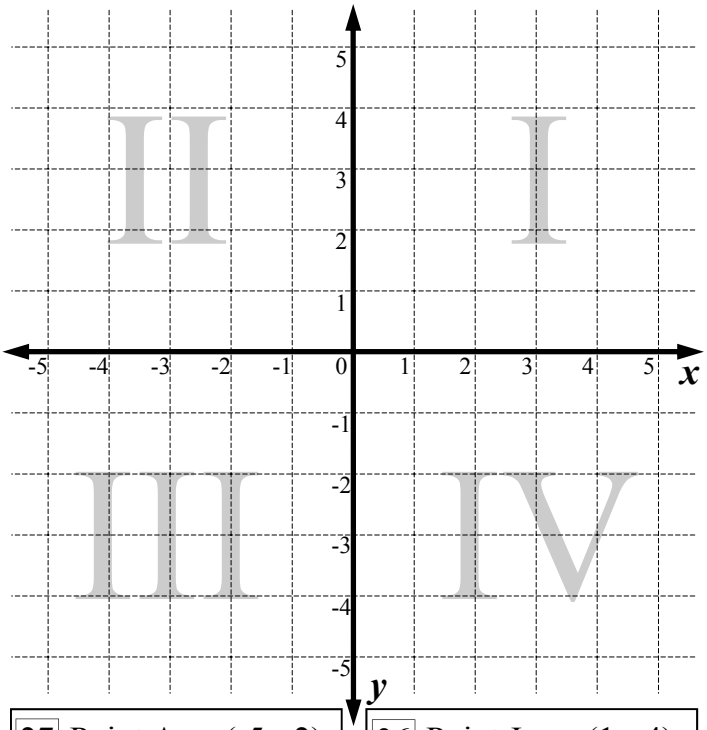
Give the co-ordinates for the points on the number plane below.



1 Point A (,)
2 Point B
3 Point C
4 Point D
5 Point E
6 Point F
7 Point G
8 Point H
9 Point I
10 Point J
11 Point K
12 Point L
13 Point M
14 Point N
15 Point O
16 Point P
17 Point Q
18 Point R
19 Point S
20 Point T
21 Point U
22 Point V
23 Point W
24 Point X
25 Point Y
26 Point Z

Plot the following points on the number plane below, label each point and give the quadrant that the point lies in.



27 Point A (-5, -2) Quadrant I II III IV Axis
28 Point B (2, 4) Quadrant I II III IV Axis
29 Point C (4, 0) Quadrant I II III IV Axis
30 Point D (3, -3) Quadrant I II III IV Axis
31 Point E (-3, 5) Quadrant I II III IV Axis
32 Point F (0, 0) Quadrant I II III IV Axis
33 Point G (5, -5) Quadrant I II III IV Axis
34 Point H (-2, 4) Quadrant I II III IV Axis
35 Point I (1, 2) Quadrant I II III IV Axis
36 Point J (1, -4) Quadrant I II III IV Axis
37 Point K (-3, -4) Quadrant I II III IV Axis
38 Point L (-1, 0) Quadrant I II III IV Axis
39 Point M (-4, 2) Quadrant I II III IV Axis
40 Point N (3, -5) Quadrant I II III IV Axis
41 Point O (0, -3) Quadrant I II III IV Axis
42 Point P (-5, -5) Quadrant I II III IV Axis
43 Point R (-2, 1) Quadrant I II III IV Axis
44 Point S (2, -2) Quadrant I II III IV Axis

Cartesian Plane - Drawing Animals - All Quadrants (Sheet 2)

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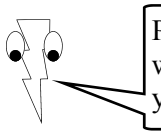
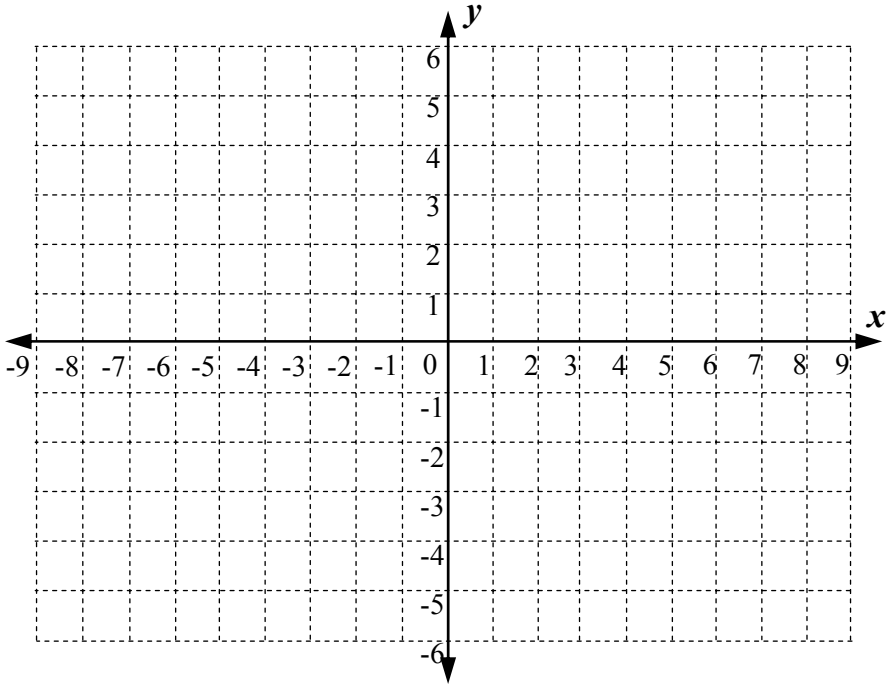


Plot the points and join them with lines to meet one of your more colourful friends

Co-ordinates: START: (-1, 3) , (-1, 4) , (1, 6) , (2, 6) , (6, 5) , (7, 4) , (7, 2) , (6, -1) , (3, -2) , (5,-4) , (5, -5) , (3, -6) , (1, -6) , (-2, -4) , (-4, -6) , (-5, -6) , (-6, -5) , (-6, -4) , (-5, -2) , (-6, -1) , (-8, 2) , (-8, 4) , (-7, 6) , (-6, 6) , (-4, 4) , (-4, 3) , STOP!

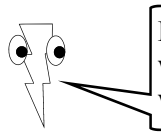


START: (-2, 1) , (1, 4) , (4, 4) , (5, 2) , (3,-1) , (0, -2) , (3, -3) , (3, -5) , (1, -5) , (-1, -4) , (-2, -3) , (-4, -5) , (-5, -5) , (-5, -3) , (-3, -2) , (-5, -1) , (-7, 2) , (-6, 4) , (-5, 4) , (-3,1) , STOP!

START: (-4, 3) , (-3, 4) , (-2, 4) , (-1, 3) , (-2, 2) , (-2, -4) , (-3, 2) , (-4, 3) , STOP!

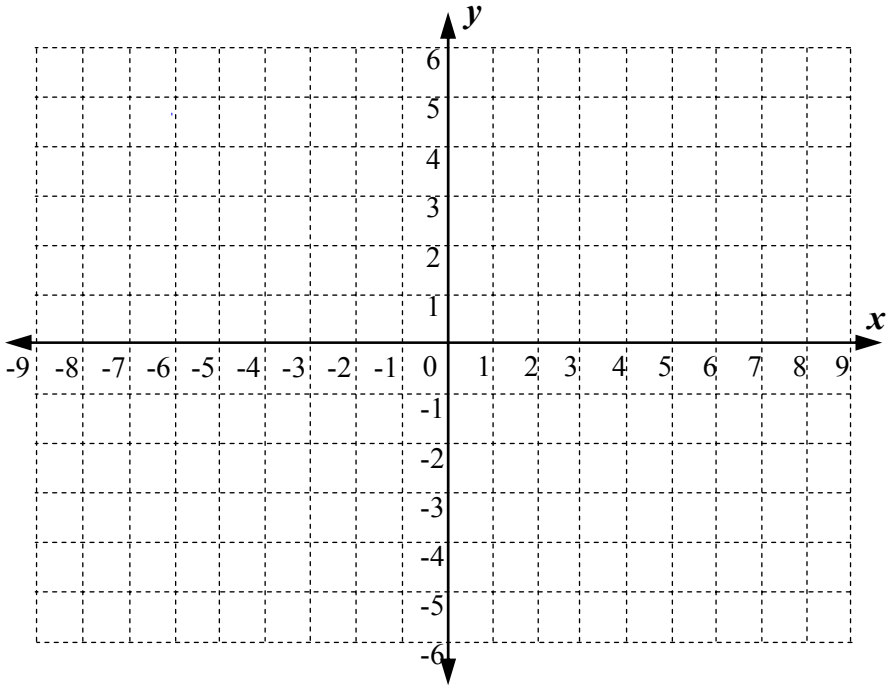
START: (-3, 4) , (-4, 6) , STOP!

START: (-2, 4) , (-1, 6) , STOP!



Plot the points and join them with lines to share your lunch with your vegetarian friend.

Co-ordinates: START: (2, -1) , (3, -3) , (3, -4) , (2, -5) , (0, -6) , (-1, -6) , (-3, -5) , (-4, -4) , (-4, -3) , (-3, -1) , (-6, 2) , (-7, -4) , (-8, 4) , (-7, 6) , (-4, 5) , (-2, -1) , (0, -1) , (3, 4) , (5, 6) , (8, 6) , (9, 4) , (5, 6) , STOP!



START: (7, 5) , (6, 3) , (2, -1) , STOP!

START: (2, 0) , (4, 4) , (6, 5) , (5, 3) , (2, 0) , STOP!

START: (-3, 0) , (-5, 2) , (-6, 4) , (-4, 3) , (-3, 0) , STOP!

START: (-2, -4) , (-6, -4) , STOP!

START: (-2, -4) , (-5, -2) , STOP!

START: (-2, -4) , (-5, -3) , STOP!

START: (1, -4) , (5, -4) , STOP!

START: (1, -4) , (5, -3) , STOP!

START: (1, -4) , (5, -5) , STOP!

Cartesian Plane - Plotting Points - All Quadrants (Sheet 1)

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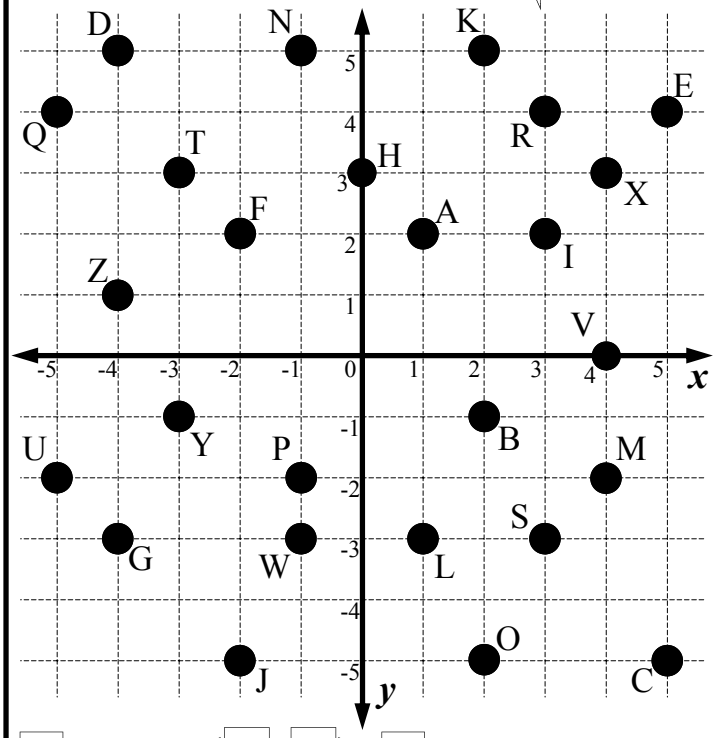
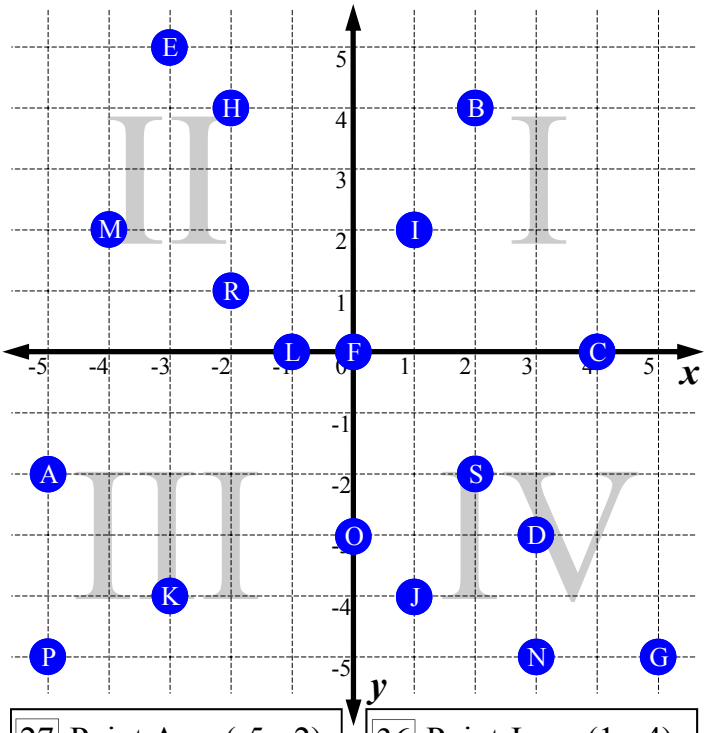
Give the co-ordinates for the points on the number plane below.



1	Point A	(1, 2)	14	Point N	(-1, 5)
2	Point B	(2, -1)	15	Point O	(2, -5)
3	Point C	(5, -5)	16	Point P	(-1, -2)
4	Point D	(-4, 5)	17	Point Q	(-5, 4)
5	Point E	(5, 4)	18	Point R	(3, 4)
6	Point F	(-2, 2)	19	Point S	(3, -3)
7	Point G	(-4, -3)	20	Point T	(-3, 3)
8	Point H	(0, 3)	21	Point U	(-5, -2)
9	Point I	(3, 2)	22	Point V	(4, 0)
10	Point J	(-2, -5)	23	Point W	(-1, -3)
11	Point K	(2, 5)	24	Point X	(4, 3)
12	Point L	(1, -3)	25	Point Y	(-3, -1)
13	Point M	(4, -2)	26	Point Z	(-4, 1)

Plot the following points on the number plane below, label each point and give the quadrant that the point lies in.



27 Point A (-5, -2) Quadrant I II III IV **Axis**

28 Point B (2, 4) Quadrant **I** II III IV Axis

29 Point C (4, 0) Quadrant I II III IV **Axis**

30 Point D (3, -3) Quadrant I II III IV **Axis**

31 Point E (-3, 5) Quadrant **II** III IV Axis

32 Point F (0, 0) Quadrant I II III IV **Axis**

33 Point G (5, -5) Quadrant I II III IV **Axis**

34 Point H (-2, 4) Quadrant **II** III IV Axis

35 Point I (1, 2) Quadrant **I** II III IV Axis

36 Point J (1, -4) Quadrant I II III IV **Axis**

37 Point K (-3, -4) Quadrant I II III IV **Axis**

38 Point L (-1, 0) Quadrant I II III IV **Axis**

39 Point M (-4, 2) Quadrant I **II** III IV Axis

40 Point N (3, -5) Quadrant I II III IV **Axis**

41 Point O (0, -3) Quadrant I II III IV **Axis**

42 Point P (-5, -5) Quadrant I II III IV **Axis**

43 Point R (-2, 1) Quadrant I **II** III IV Axis

44 Point S (2, -2) Quadrant I II III IV **Axis**

Cartesian Plane - Drawing Animals - All Quadrants (Sheet 2)

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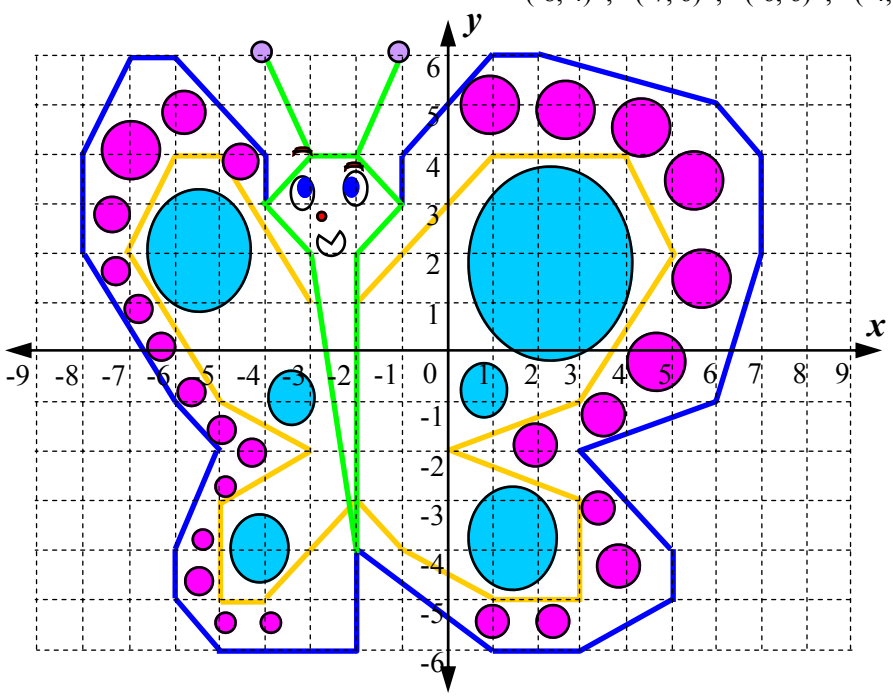
Plot the points and join them with lines to meet one of your more colourful friends

Co-ordinates: START: (-1, 3) , (-1, 4) , (1, 6) , (2, 6) , (6, 5) , (7, 4) , (7, 2) , (6, -1) , (3, -2) , (5,-4) , (5, -5) , (3, -6) , (1, -6) , (-2, -4) , (-4, -6) , (-5, -6) , (-6, -5) , (-6, -4) , (-5, -2) , (-6, -1) , (-8, 2) , (-8, 4) , (-7, 6) , (-6, 6) , (-4, 4) , (-4, 3) , STOP!



START: (-2, 1) , (1, 4) , (4, 4) , (5, 2) , (3,-1) , (0, -2) , (3, -3) , (3, -5) , (1, -5) , (-1, -4) , (-2, -3) , (-4, -5) , (-5, -5) , (-5, -3) , (-3, -2) , (-5, -1) , (-7, 2) , (-6, 4) , (-5, 4) , (-3,1) , STOP!

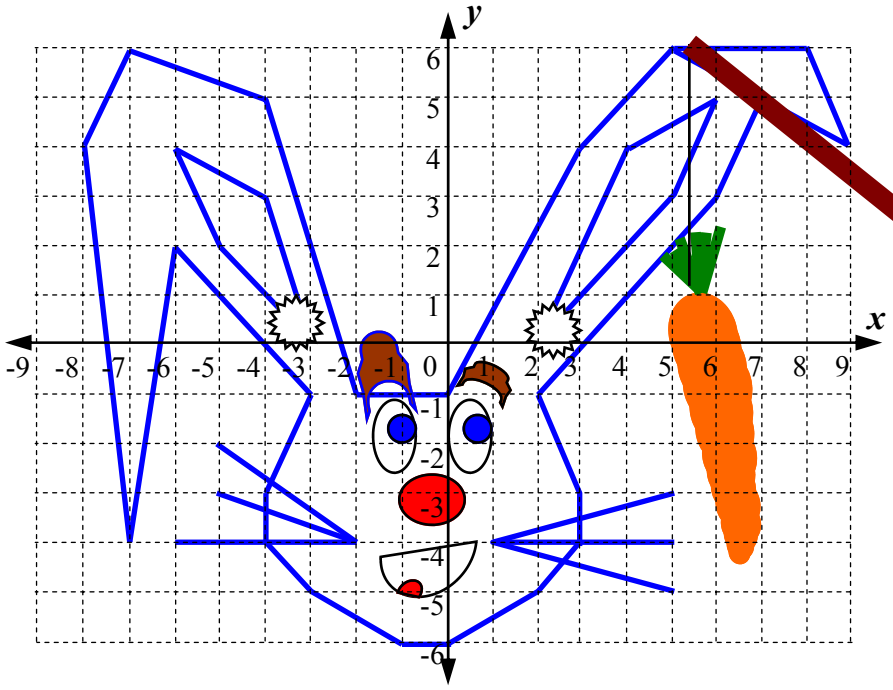
START: (-4, 3) , (-3, 4) , (-2, 4) , (-1, 3) , (-2, 2) , (-2, -4) , (-3, 2) , (-4, 3) , STOP!

START: (-3, 4) , (-4, 6) , STOP!

START: (-2, 4) , (-1, 6) , STOP!

Plot the points and join them with lines to share your lunch with your vegetarian friend.

Co-ordinates: START: (2, -1) , (3, -3) , (3, -4) , (2, -5) , (0, -6) , (-1, -6) , (-3, -5) , (-4, -4) , (-4, -3) , (-3, -1) , (-6, 2) , (-7, -4) , (-8, 4) , (-7, 6) , (-4, 5) , (-2, -1) , (0, -1) , (3, 4) , (5, 6) , (8, 6) , (9, 4) , (5, 6) , STOP!



START: (7, 5) , (6, 3) , (2, -1) , STOP!

START: (2, 0) , (4, 4) , (6, 5) , (5, 3) , (2, 0) , STOP!

START: (-3, 0) , (-5, 2) , (-6, 4) , (-4, 3) , (-3, 0) , STOP!

START: (-2, 4) , (-6, -4) , STOP!

START: (-2, -4) , (5, -2) , STOP!

START: (-2, -4) , (-5, -3) , STOP!

START: (1, -4) , (5, -4) , STOP!

START: (1, -4) , (5, -3) , STOP!

START: (1, -4) , (5, -5) , STOP!

Cartesian Plane - Plotting Points - All Quadrants (Homework Strip)

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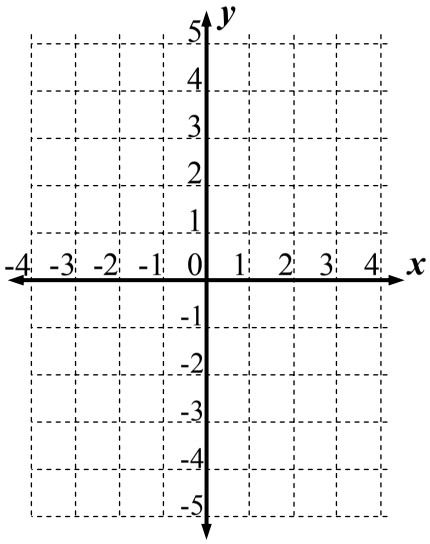
Date Due: _____

Plot and join the points, name the shape



1 (-3, 2) ; (2, 5) ; (-3, 5) .

Shape formed: _____

2 (1, 3) ; (3, 1) ; (0, -2) ; (-2, 0) .

Shape formed: _____

3 (3, -5) ; (-3, -5) ; (-4, -2) ; (2, -2) .

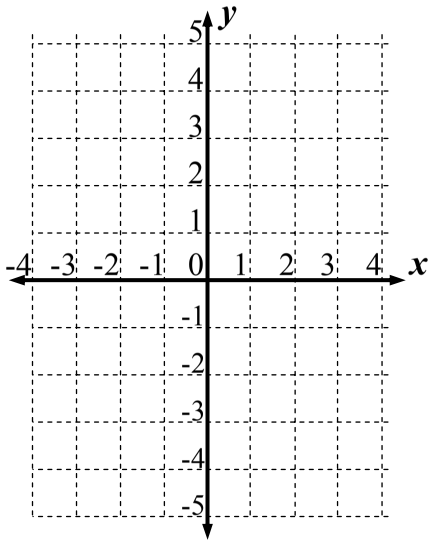
Shape formed: _____

4 (1, 1) ; (4, -3) ; (-3, -3) ; (-3, 1) .

Shape formed: _____

Date Due: _____

Plot and join the points, name the shape



1 (-3, 2) ; (2, 5) ; (-3, 5) .

Shape formed: _____

2 (1, 3) ; (3, 1) ; (0, -2) ; (-2, 0) .

Shape formed: _____

3 (3, -5) ; (-3, -5) ; (-4, -2) ; (2, -2) .

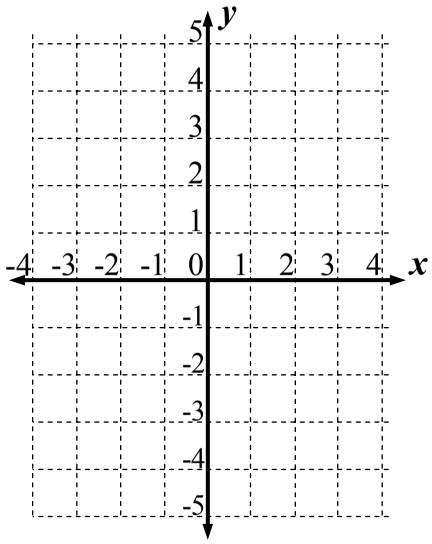
Shape formed: _____

4 (1, 1) ; (4, -3) ; (-3, -3) ; (-3, 1) .

Shape formed: _____

Date Due: _____

Plot and join the points, name the shape



1 (-3, 2) ; (2, 5) ; (-3, 5) .

Shape formed: _____

2 (1, 3) ; (3, 1) ; (0, -2) ; (-2, 0) .

Shape formed: _____

3 (3, -5) ; (-3, -5) ; (-4, -2) ; (2, -2) .

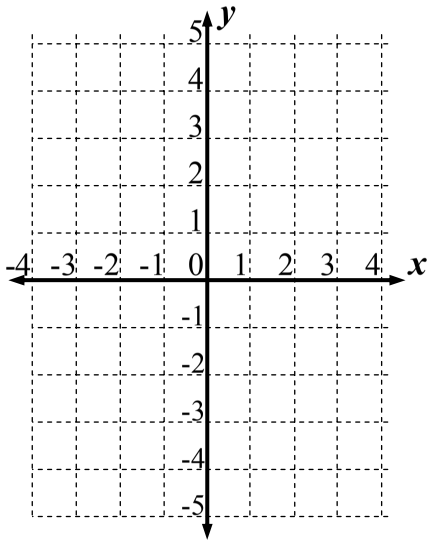
Shape formed: _____

4 (1, 1) ; (4, -3) ; (-3, -3) ; (-3, 1) .

Shape formed: _____

Date Due: _____

Plot and join the points, name the shape



1 (-3, 2) ; (2, 5) ; (-3, 5) .

Shape formed: _____

2 (1, 3) ; (3, 1) ; (0, -2) ; (-2, 0) .

Shape formed: _____

3 (3, -5) ; (-3, -5) ; (-4, -2) ; (2, -2) .

Shape formed: _____

4 (1, 1) ; (4, -3) ; (-3, -3) ; (-3, 1) .

Shape formed: _____

Cartesian Plane - Plotting Points - All Quadrants (Homework Strip)

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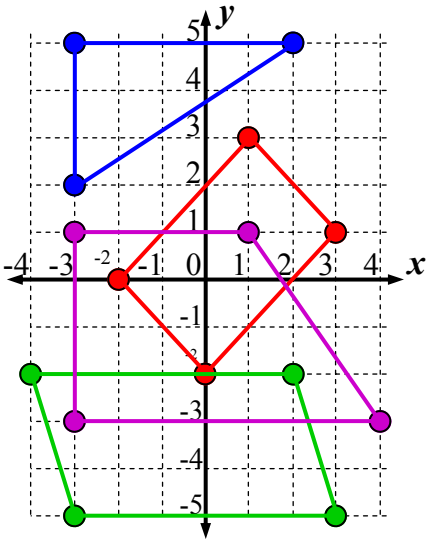
Date Due: _____

Plot and join the points, name the shape



1 (-3, 2) ; (2, 5) ; (-3, 5) .

Shape formed: Right triangle

2 (1, 3) ; (3, 1) ; (0, -2) ; (-2, 0) .

Shape formed: Rectangle

3 (3, -5) ; (-3, -5) ; (-4, -2) ; (2, -2) .

Shape formed: Parallelogram

4 (1, 1) ; (4, -3) ; (-3, -3) ; (-3, 1) .

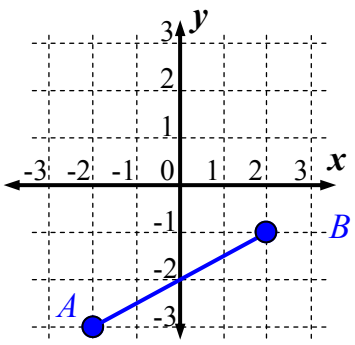
Shape formed: Trapezium

Cartesian Plane - Midpoint - All Quadrants

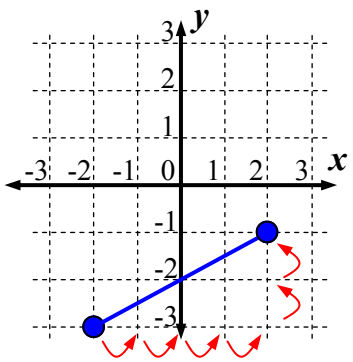
If you draw a line, halfway along that line is the midpoint. There are two common ways of finding the location of the midpoint. You can measure it's location on a number plane 'Graphically', or you can calculate its location 'Analytically'.

Graphical Solution

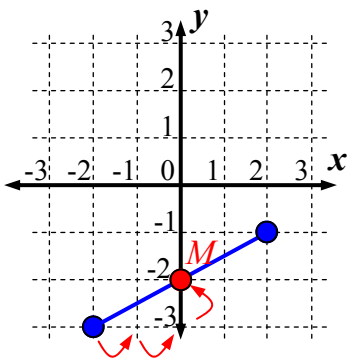
Example: Find the midpoint *M* on the interval joining *A* (-2, -3) and *B* (2, -1)



Plot *A* and *B* and draw the interval *AB*



Count the 'hops' and halve them. Horizontal is 4 hops, so midpoint is 2 hops right of the -2. So it is 0. Vertical is 2 hops, so midpoint is 1 hop above the -3. So it is -2.



Plot the midpoint and label it *M*.
There is a space in the question to record its coordinates, for the *M* above, it is (0, -2).

Analytical Method

It may be that the points aren't graphed, or the values are that large that graphing them isn't feasible. Or you just prefer using numbers, either way you can find the midpoint using this formula:

$$M(\bar{x}, \bar{y}) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

Where one point is (x_1, y_1), and the other point is (x_2, y_2).

What does this mean? It means that you add the *x*-values and divide them by 2, for the *x* coordinate of the midpoint. Then repeat for the *y*-values, for the *y* coordinate of the midpoint. There is an example at the bottom of Column 1 on Sheet 2.

Cartesian Plane - Midpoint (Graphical) - All Quadrants (Sheet 1)

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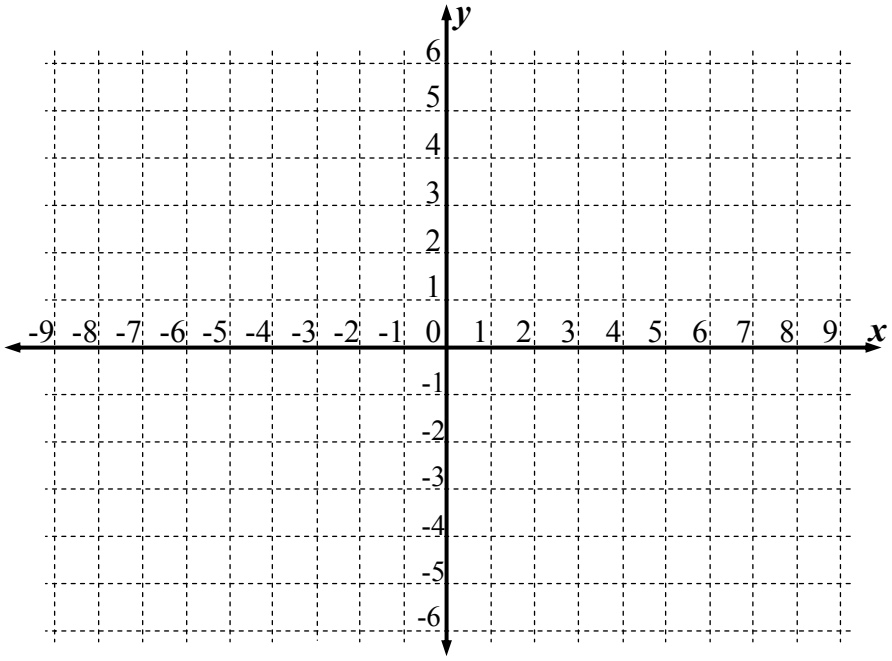
Plot the points and use a ruler to rule a line between the two points and find the midpoint. Plot the midpoint on the line record its co-ordinates. Write letters in pencil, as you may need to move them later!



Steps: Plot the points on the number plane.
Rule a line in between the two points.
Plot the midpoint, call it 'M'.
Write the co-ordinate for the midpoint.

1 *A* (-7, 5) and *H* (-3, 3).

Midpoint: (___ , ___)

Label the midpoint '*M*' on the number plane

2 *G* (8, -2) and *E* (2, -5).

Midpoint: (___ , ___)

3 *L* (-2, 6) and *F* (0, 4).

Midpoint: _____

4 *B* (7, 3) and *D* (-3, -1).

Midpoint: _____

5 *N* (-1, 2) and *P* (5, 6).

Midpoint: _____

6 *K* (-9, 3) and *H* (-3, 3).

Midpoint: _____

7 *C* (-9, -5) and *F* (0, 4).

Midpoint: _____

8 *J* (-6, -6) and *D* (-3, -1).

Midpoint: _____

9 *A* (-7, 5) and *F* (0, 4).

Midpoint: _____

10 *B* (7, 3) and *G* (8, -2).

Midpoint: _____

11 *G* (8, -2) and *D* (-3, -1).

Midpoint: _____

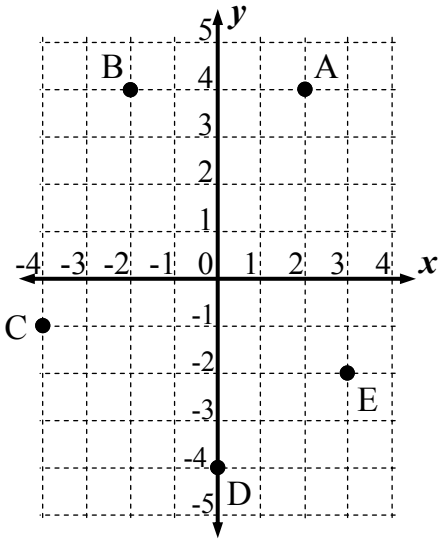
12 *C* (-9, -5) and *K* (-9, 3).

Midpoint: _____

13 *C* (-9, -5) and *E* (2, -5).

Midpoint: _____

This time the points are plotted, rule the line, find the midpoint and record all coordinates.



14 Construct *AB* and find '*M*'

A: (___ , ___) *B*: (___ , ___)

Midpoint *M*: (___ , ___)

15 Construct *AD* and find '*M*'

A: (___ , ___) *D*: (___ , ___)

Midpoint *M*: (___ , ___)

16 Construct *CB* and find '*M*'

C: (___ , ___) *B*: (___ , ___)

Midpoint *M*: (___ , ___)

17 Construct *EA* and find '*M*'

E: (___ , ___) *A*: (___ , ___)

Midpoint *M*: (___ , ___)

18 Construct *DE* and find '*M*'

D: (___ , ___) *E*: (___ , ___)

Midpoint *M*: (___ , ___)

Cartesian Plane - Midpoint (Analytical) - All Quadrants (Sheet 2)

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Find the average of these two numbers. Add them, press '=' and then divide by 2. Always write negatives in brackets.

1 -6 and -12

$$\bar{x} = \frac{(\square) + (\square)}{2} = \square$$

Calc: [−](-) 6 + [−](-) 1 2 = ÷ 2 =

2 -7 and 21

$$\bar{x} = \frac{(\square) + \square}{2} = \square$$

3 6 and -12

$\bar{x} =$

4 -4 and -9

$\bar{x} =$

With halves use '½' not '.5'

Find the midpoint of the interval that joins these two points. Find two averages.

Example

Find the midpoint of the interval joining (-4, -3) and (8, -11).

x_1 y_1 x_2 y_2

$$\bar{x} = \frac{(-4) + 8}{2} = 2$$

$$\bar{y} = \frac{(-3) + (-11)}{2} = -7$$

$M(\bar{x}, \bar{y}) = (2, -7)$

5 (2, -3) and (-6, 9).

$$\bar{x} = \frac{\square + (\square)}{2} = \square$$

$$\bar{y} = \frac{(\square) + \square}{2} = \square$$

$M(\bar{x}, \bar{y}) = (\square, \square)$

6 (-1, -6) and (-3, 10).

$$\bar{x} = \frac{(\square) + (\square)}{2} = \square$$

$$\bar{y} = \frac{(\square) + \square}{2} = \square$$

$M(\bar{x}, \bar{y}) = (\square, \square)$

7 (7, -5) and (-3, 9).

$\bar{x} =$

$\bar{y} =$

$M(\bar{x}, \bar{y}) = (\square, \square)$

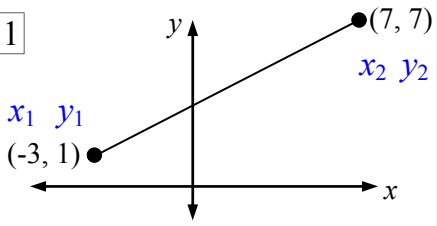
8 (-9, -2) and (-1, -9).

9 (3, 8) and (-3, -6).

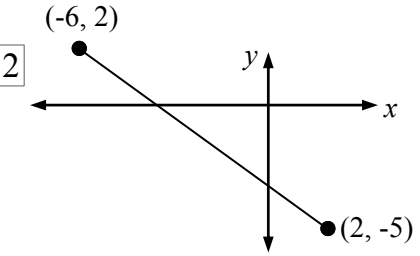
10 (0, -5) and (-10, 8).

Use the same method, but this time get your information from a sketch. Label points (x_1, y_1)…

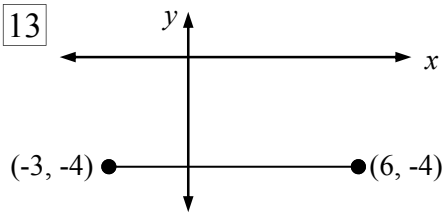
11



12



13



Cartesian Plane - Midpoint (Graphical) - All Quadrants (Sheet 1)

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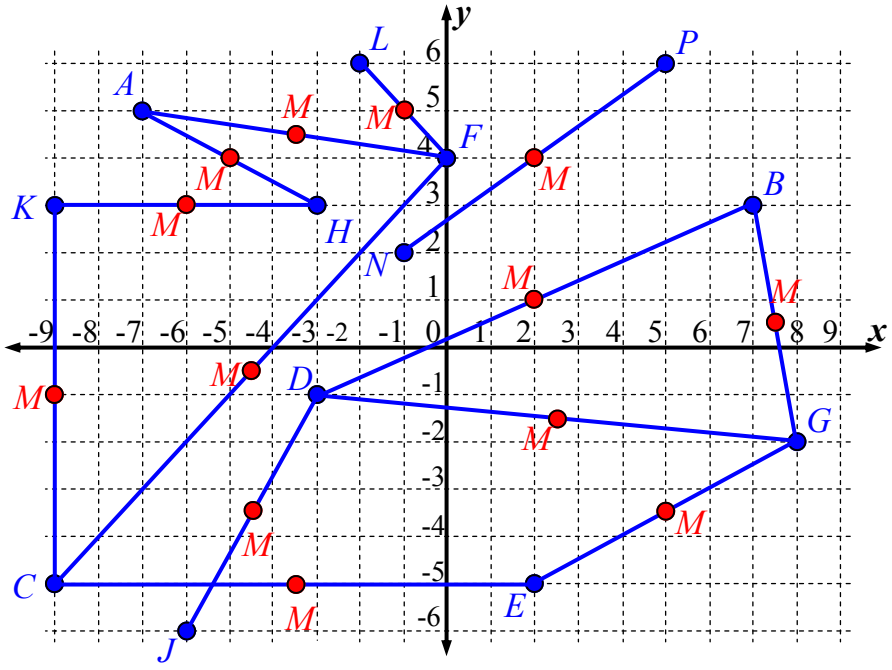
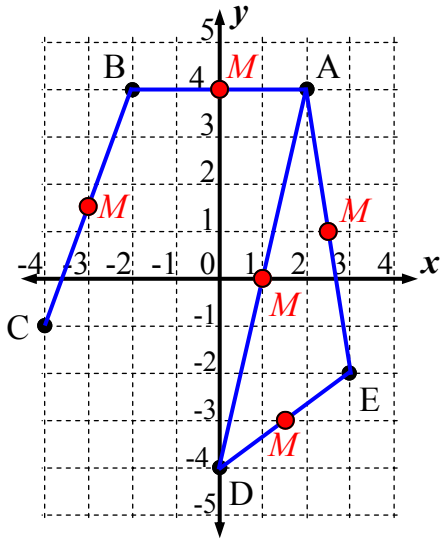
Plot the points and use a ruler to rule a line between the two points and find the midpoint. Plot the midpoint on the line record its co-ordinates. Write letters in pencil, as you may need to move them later!



This time the points are plotted, rule the line, find the midpoint and record all coordinates.



Steps: Plot the points on the number plane.
Rule a line in between the two points.
Plot the midpoint, call it 'M'.
Write the co-ordinate for the midpoint.

1 A (-7, 5) and H (-3, 3).

Midpoint: (-5 , 4)

Label the midpoint 'M' on the number plane

2 G (8, -2) and E (2, -5).

Midpoint: (5 , -3½)

3 L (-2, 6) and F (0, 4).

Midpoint: (-1, 5)

4 B (7, 3) and D (-3, -1).

Midpoint: (2, 1)

5 N (-1, 2) and P (5, 6).

Midpoint: (2, 4)

6 K (-9, 3) and H (-3, 3).

Midpoint: (-6, 3)

7 C (-9, -5) and F (0, 4).

Midpoint: (-4½, -½)

8 J (-6, -6) and D (-3, -1).

Midpoint: (-4½, -3½)

9 A (-7, 5) and F (0, 4).

Midpoint: (-3½, 4½)

10 B (7, 3) and G (8, -2).

Midpoint: (7½, ½)

11 G (8, -2) and D (-3, -1).

Midpoint: (2½, -1½)

12 C (-9, -5) and K (-9, 3).

Midpoint: (-9, -1)

13 C (-9, -5) and E (2, -5).

Midpoint: (-3½, -5)

14 Construct AB and find 'M'

A: (2 , 4) B: (-2 , 4)

Midpoint M: (0 , 4)

15 Construct AD and find 'M'

A: (2 , 4) D: (0 , -4)

Midpoint M: (1 , 0)

16 Construct CB and find 'M'

C: (-4 , -1) B: (-2 , 4)

Midpoint M: (-3 , 1½)

17 Construct EA and find 'M'

E: (3 , -2) A: (2 , 4)

Midpoint M: (2½ , 1)

18 Construct DE and find 'M'

D: (0 , -4) E: (3 , -2)

Midpoint M: (1½ , -3)

Cartesian Plane - Midpoint (Analytical) - All Quadrants (Sheet 2)

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Find the average of these two numbers. Add them, press '=' and then divide by 2. Always write negatives in brackets.

1 -6 and -12

$\bar{x} = \dfrac{(\boxed{-6}) + (\boxed{-12})}{2} = \boxed{-9}$

Calc: [−] [(-)] 6 [+] [−] [(-)] 1 2 [=] [÷] 2 [=]

2 -7 and 21

$\bar{x} = \dfrac{(\boxed{-7}) + \boxed{21}}{2} = \boxed{7}$

3 6 and -12

$\bar{x} = \dfrac{6 + (-12)}{2} = -3$

4 -4 and -9

$\bar{x} = \dfrac{(-4) + (-9)}{2} = -6\frac{1}{2}$

With halves use '½' not '.5'

Find the midpoint of the interval that joins these two points. Find two averages.

Example

Find the midpoint of the interval joining (-4, -3) and (8, -11).

$x_1\ y_1 \qquad x_2\ y_2$

$\bar{x} = \dfrac{(-4) + 8}{2} = 2$

$\bar{y} = \dfrac{(-3) + (-11)}{2} = -7$

$M(\bar{x}, \bar{y}) = (2, -7)$

5 (2, -3) and (-6, 9).

$x_1\ y_1 \qquad x_2\ y_2$

$\bar{x} = \dfrac{\boxed{2} + (\boxed{-6})}{2} = \boxed{-2}$

$\bar{y} = \dfrac{(\boxed{-3}) + \boxed{9}}{2} = \boxed{3}$

$M(\bar{x}, \bar{y}) = (\boxed{-2}, \boxed{3})$

6 (-1, -6) and (-3, 10).

$x_1\ y_1 \qquad x_2\ y_2$

$\bar{x} = \dfrac{(\boxed{-1}) + (\boxed{-3})}{2} = \boxed{-2}$

$\bar{y} = \dfrac{(\boxed{-6}) + \boxed{10}}{2} = \boxed{2}$

$M(\bar{x}, \bar{y}) = (\boxed{-2}, \boxed{2})$

7 (7, -5) and (-3, 9).

$x_1\ y_1 \qquad x_2\ y_2$

$\bar{x} = \dfrac{7 + (-3)}{2} = 2$

$\bar{y} = \dfrac{(-5) + 9}{2} = 2$

$M(\bar{x}, \bar{y}) = (\boxed{2}, \boxed{2})$

8 (-9, -2) and (-1, -9).

$x_1\ y_1 \qquad x_2\ y_2$

$\bar{x} = \dfrac{(-9) + (-1)}{2} = -5$

$\bar{y} = \dfrac{(-2) + (-9)}{2} = -5\frac{1}{2}$

$M(\bar{x}, \bar{y}) = (-5, -5\frac{1}{2})$

9 (3, 8) and (-3, -6).

$x_1\ y_1 \qquad x_2\ y_2$

$\bar{x} = \dfrac{3 + (-3)}{2} = 0$

$\bar{y} = \dfrac{8 + (-6)}{2} = 1$

$M(\bar{x}, \bar{y}) = (0, 1)$

10 (0, -5) and (-10, 8).

$x_1\ y_1 \qquad x_2\ y_2$

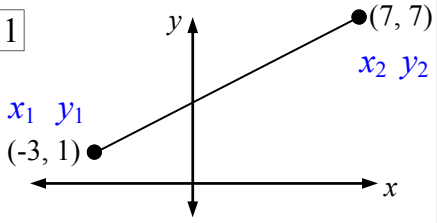
$\bar{x} = \dfrac{0 + (-10)}{2} = -5$

$\bar{y} = \dfrac{(-5) + 8}{2} = 1\frac{1}{2}$

$M(\bar{x}, \bar{y}) = (-5, 1\frac{1}{2})$

Use the same method, but this time get your information from a sketch. Label points (x_1, y_1)…

11

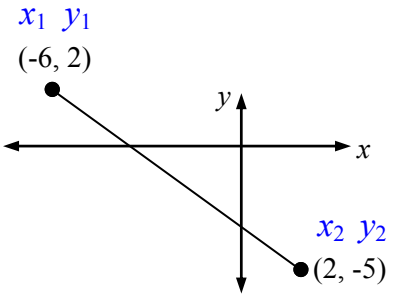


$\bar{x} = \dfrac{(-3) + 7}{2} = 2$

$\bar{y} = \dfrac{1 + 7}{2} = 4$

$M(\bar{x}, \bar{y}) = (2, 4)$

12

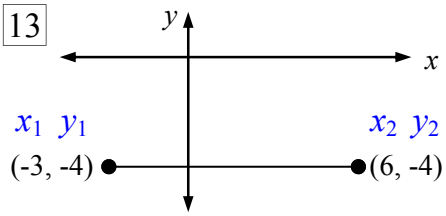


$\bar{x} = \dfrac{(-6) + 2}{2} = -2$

$\bar{y} = \dfrac{2 + (-5)}{2} = -1\frac{1}{2}$

$M(\bar{x}, \bar{y}) = (-2, -1\frac{1}{2})$

13



$\bar{x} = \dfrac{(-3) + 6}{2} = 1\frac{1}{2}$

$\bar{y} = \dfrac{(-4) + (-4)}{2} = -4$

$M(\bar{x}, \bar{y}) = (1\frac{1}{2}, -4)$

Cartesian Plane - Midpoint - All Quadrants (Homework Strip)

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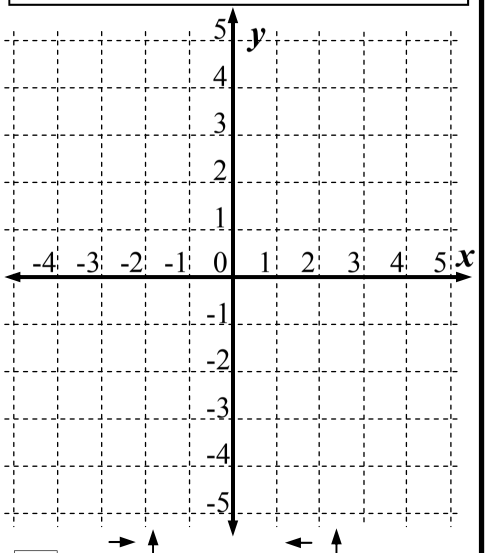
Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 *A* (2, 5) and *B* (-4, 3).

Midpoint: (,)

2 *C* (2, -5) and *D* (-2, -1).

Midpoint: (,)

3 *E* (2, -2) and *F* (5, 4).

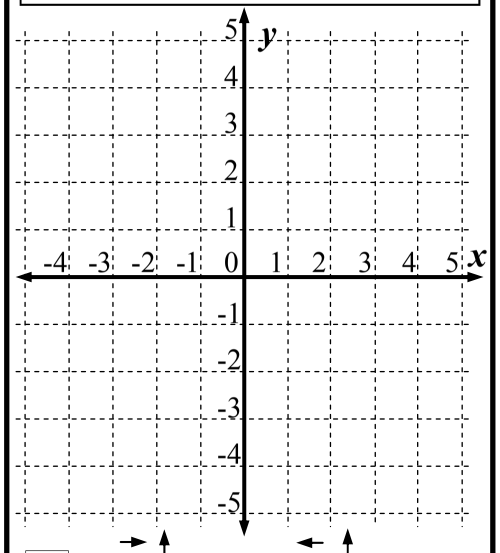
Midpoint: (,)

4 *G* (-3, 2) and *H* (-4, -4).

Midpoint: (,)

Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 *A* (2, 5) and *B* (-4, 3).

Midpoint: (,)

2 *C* (2, -5) and *D* (-2, -1).

Midpoint: (,)

3 *E* (2, -2) and *F* (5, 4).

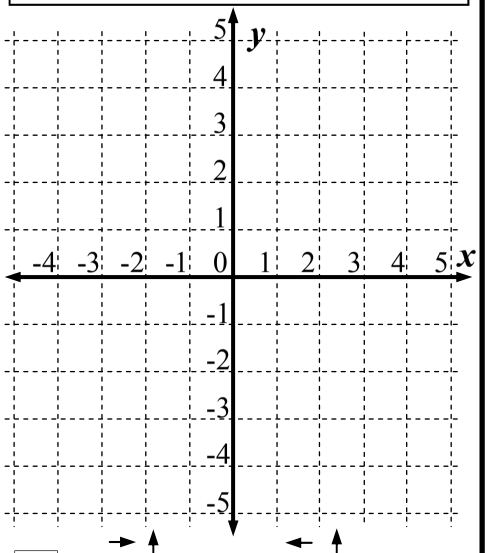
Midpoint: (,)

4 *G* (-3, 2) and *H* (-4, -4).

Midpoint: (,)

Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 *A* (2, 5) and *B* (-4, 3).

Midpoint: (,)

2 *C* (2, -5) and *D* (-2, -1).

Midpoint: (,)

3 *E* (2, -2) and *F* (5, 4).

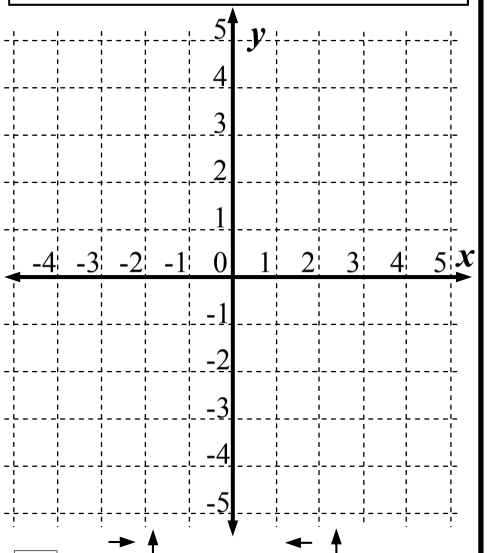
Midpoint: (,)

4 *G* (-3, 2) and *H* (-4, -4).

Midpoint: (,)

Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 *A* (2, 5) and *B* (-4, 3).

Midpoint: (,)

2 *C* (2, -5) and *D* (-2, -1).

Midpoint: (,)

3 *E* (2, -2) and *F* (5, 4).

Midpoint: (,)

4 *G* (-3, 2) and *H* (-4, -4).

Midpoint: (,)

Cartesian Plane - Midpoint - All Quadrants (Homework Strip)

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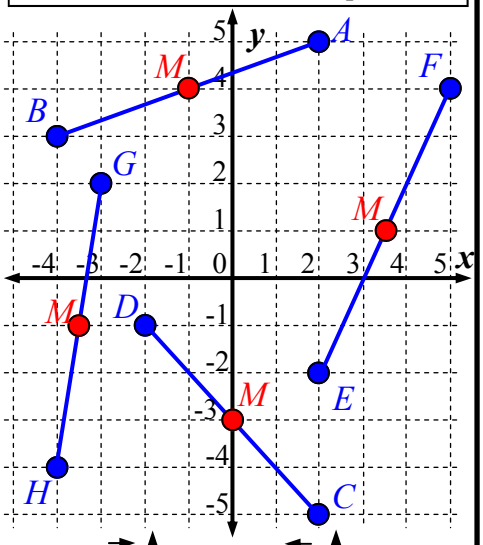
Date Due: _____

Plot and label the points, plot and give the coordinates for the midpoint *M*.



1 *A* (2, 5) and *B* (-4, 3).

Midpoint: (-1 , 4)

2 *C* (2, -5) and *D* (-2, -1).

Midpoint: (0 , -3)

3 *E* (2, -2) and *F* (5, 4).

Midpoint: (3½ , 1)

4 *G* (-3, 2) and *H* (-4, -4).

Midpoint: (-3½ , -1)

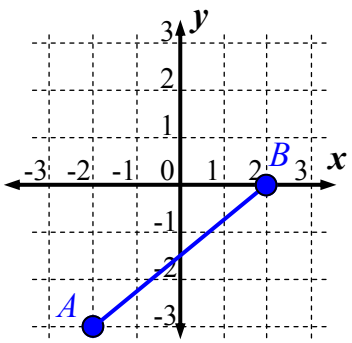
Cartesian Plane - Introduction to Gradient

Gradient is a measure of slope. So the larger the number, the steeper the interval is. A gradient of 5 is much steeper than a gradient of 1. Gradient is found creating a 'gradient triangle' and measuring the rise over the run, the vertical length over the horizontal. Gradient is given the symbol '*m*', it has nothing to do with the midpoint.

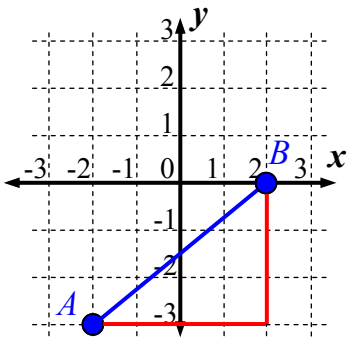
$$m = \frac{Rise}{Run} = \frac{Vertical\ Distance}{Horizontal\ Distance}$$

Here is an example of finding the gradient.

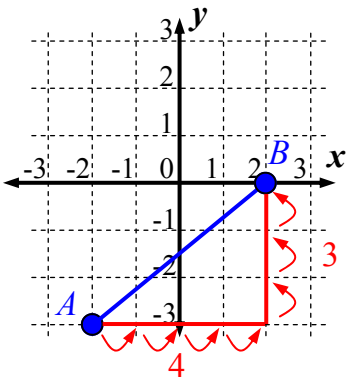
Example: Find the gradient of the interval joining *A* (-2, -3) and *B* (2, 0)



Plot *A* and *B* and draw the interval *AB*



Construct a gradient triangle, which is a right angle triangle which has AB as its hypotenuse.



Count and mark the rise and the run on the sides of the triangle.

$m = \frac{3}{4}$ ← Find the gradient by writing the rise over the run. Remember that the second sheet has all negative gradients

The process for finding the gradient is straight forward. The only issue is you can have positive and negative gradient. Positive Gradient (covered in the first sheet) 'Goes up to the right', Negative Gradient (covered in the second sheet) goes 'up to the left'.

Positive Gradient goes up to the right

Negative Gradient goes up to the left

Note that when two (or more) intervals have the same gradient, they are parallel.

Cartesian Plane - Introduction to Gradient (Positive) (Sheet 1)

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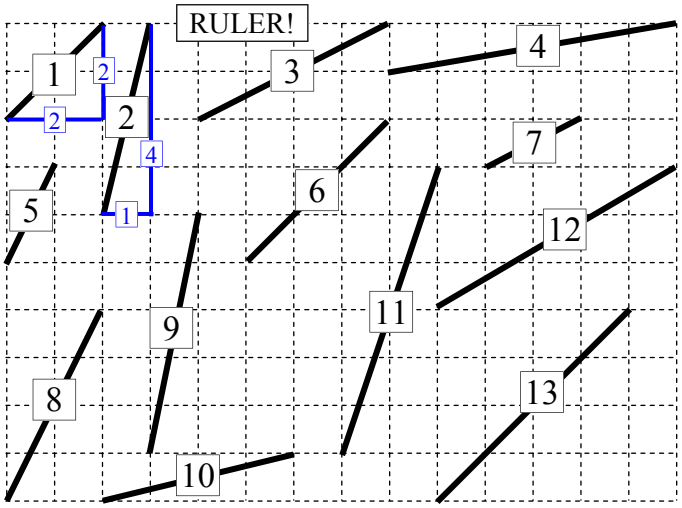
RULER!



Create 'gradient triangles' for the above intervals. Then write the 'rise' and the 'run' on each triangle. The first two are done. Find the gradient for each.

1 $m = \frac{\square}{\square} = \square$

2 $m = \frac{\square}{\square} = \square$

3 $m = \frac{\square}{\square} = \frac{\square}{\square}$

4 $m = \frac{\square}{\square}$

Calc: 2 ▪ 4 =

5 $m = \frac{\square}{\square} = \square$

6 $m = \frac{\square}{\square} = \square$

7 $m = \frac{\square}{\square}$

8 $m = \frac{\square}{\square} = \square$

9 $m = \frac{\square}{\square} = \square$

10 $m = \frac{\square}{\square}$

11 $m = \frac{\square}{\square} = \square$

12 $m = \frac{\square}{\square}$

13 $m = \frac{\square}{\square} = \square$

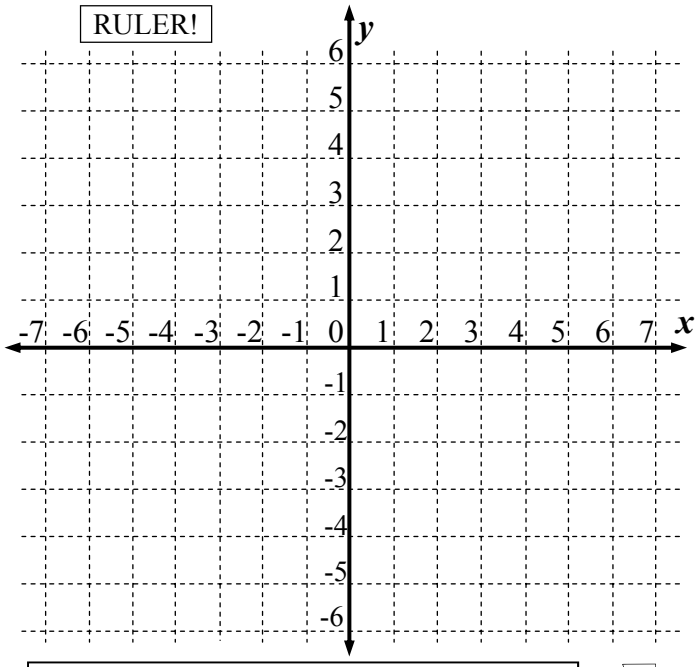
14 Which of the intervals are parallel (have the same gradient)?

a) Q3 || Q□

b) Q5 || Q□

c) Q1 || Q□ || Q□

RULER!



Plot the coordinates, then join them with an interval. Calculate the gradient for the interval by creating a gradient triangle. Use a ruler.

15 *A* (1, 2) and *B* (2, 6). $m = \frac{\square}{\square} = \square$

16 *C* (1, -2) and *D* (7, 4). $m = \frac{\square}{\square} = \square$

17 *E* (-7, -5) and *F* (-5, 3). $m = \frac{\square}{\square} = \square$

18 *G* (-7, 4) and *H* (-3, 6). $m = \frac{\square}{\square} = \frac{\square}{\square}$

19 *J* (-2, -6) and *K* (6, -2). $m = \frac{\square}{\square} = \frac{\square}{\square}$

20 *Q* (-5, -3) and *R* (-1, 1). $m = \frac{\square}{\square} = \square$

21 Which of the intervals are parallel? Use the letters on the interval to complete these:

GH || □ (2 letters) *AB* || □ *CD* || □

Cartesian Plane - Introduction to Gradient (Negative) (Sheet 2)

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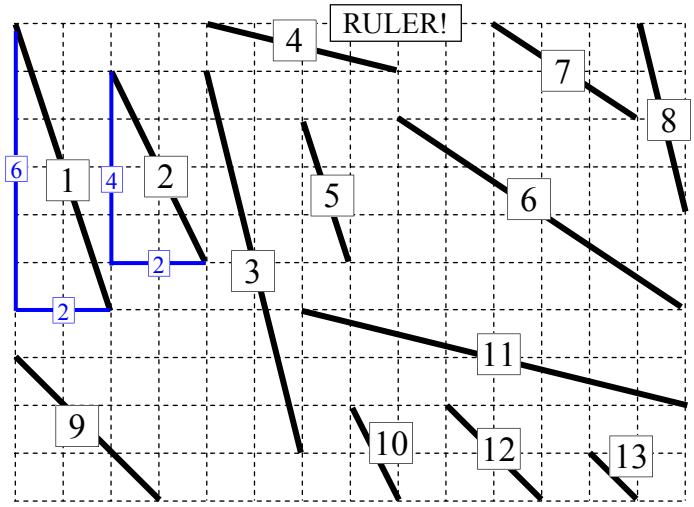
RULER!



Create 'gradient triangles' and write the 'rise' and the 'run' on each triangle, all positive numbers. Find the gradient and write a negative sign '-' in front of your answer.

1 $m =$ ☐/☐ $=$ ☐

2 $m =$ ☐/☐ $=$ ☐

3 $m =$ ☐/☐ $=$ ☐

4 $m =$ ☐/☐

5 $m =$ ☐/☐ $=$ ☐

6 $m =$ ☐/☐ $=$ ☐/☐

7 $m =$ ☐/☐

8 $m =$ ☐/☐ $=$ ☐

9 $m =$ ☐/☐ $=$ ☐

10 $m =$ ☐/☐ $=$ ☐

11 $m =$ ☐/☐ $=$ ☐/☐

12 $m =$ ☐/☐ $=$ ☐

13 $m =$ ☐/☐ $=$ ☐

14 Which of the intervals are parallel?

a) Q1 || Q☐

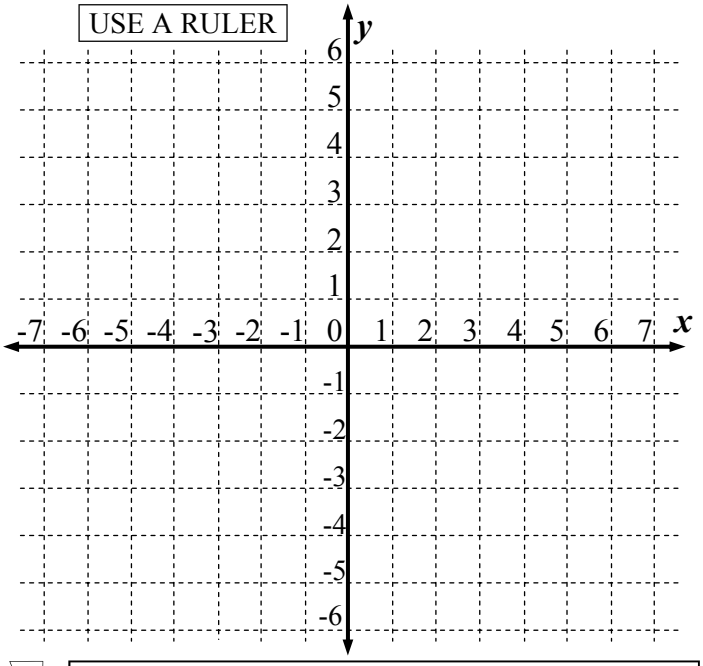
b) Q2 || Q☐

c) Q3 || Q☐

d) Q4 || Q☐

e) Q9 || Q☐ || Q☐

USE A RULER



Plot the coordinates, then join them with an interval. Calculate the gradient for the interval by creating a gradient triangle. **Use positive numbers** on the gradient triangles, but final answers will be negative.

15 A (6, 6) and B (7, 1). $m =$ ☐/☐ $=$ ☐

16 C (0, 5) and D (5, 0). $m =$ ☐/☐ $=$ ☐

17 E (-3, 3) and F (6, -3). $m =$ ☐/☐ $=$ ☐/☐

18 G (-5, 6) and H (-3, -4). $m =$ ☐/☐ $=$ ☐

19 J (-7, -2) and K (-3, -6). $m =$ ☐/☐ $=$ ☐

20 L (1, 6) and P (4, 4). $m =$ ☐/☐

21 Which of the intervals are parallel? Use the letters on the interval to complete these:

AB || ☐ EF || ☐ JK || ☐

Cartesian Plane - Introduction to Gradient (Positive) (Sheet 1)

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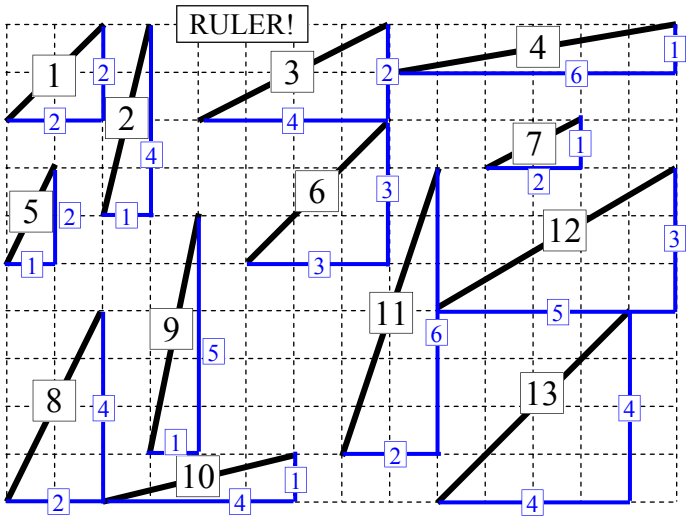


Create 'gradient triangles' for the above intervals. Then write the 'rise' and the 'run' on each triangle. The first two are done. Find the gradient for each.

1 $m = \frac{2}{2} = 1$

2 $m = \frac{4}{1} = 4$

3 $m = \frac{2}{4} = \frac{1}{2}$

4 $m = \frac{1}{6}$

Calc: 2 ▪/□ 4 =

5 $m = \frac{2}{1} = 2$

6 $m = \frac{3}{3} = 1$

7 $m = \frac{1}{2}$

8 $m = \frac{4}{2} = 2$

9 $m = \frac{5}{1} = 5$

10 $m = \frac{1}{4}$

11 $m = \frac{6}{2} = 3$

12 $m = \frac{3}{5}$

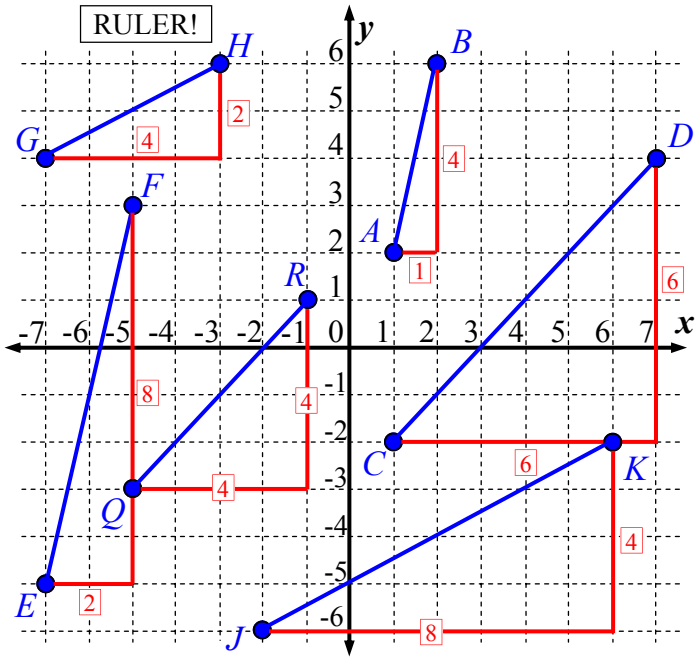
13 $m = \frac{4}{4} = 1$

14 Which of the intervals are parallel (have the same gradient)?

a) Q3 || Q 7

b) Q5 || Q 8

c) Q1 || Q 6 || Q 13



Plot the coordinates, then join them with an interval. Calculate the gradient for the interval by creating a gradient triangle. Use a ruler.

15 *A* (1, 2) and *B* (2, 6). $m = \frac{4}{1} = 4$

16 *C* (1, -2) and *D* (7, 4). $m = \frac{6}{6} = 1$

17 *E* (-7, -5) and *F* (-5, 3). $m = \frac{8}{2} = 4$

18 *G* (-7, 4) and *H* (-3, 6). $m = \frac{2}{4} = \frac{1}{2}$

19 *J* (-2, -6) and *K* (6, -2). $m = \frac{4}{8} = \frac{1}{2}$

20 *Q* (-5, -3) and *R* (-1, 1). $m = \frac{4}{4} = 1$

21 Which of the intervals are parallel? Use the letters on the interval to complete these:

GH || *JK* (2 letters) *AB* || *EF* *CD* || *QR*

Cartesian Plane - Introduction to Gradient (Negative) (Sheet 2)

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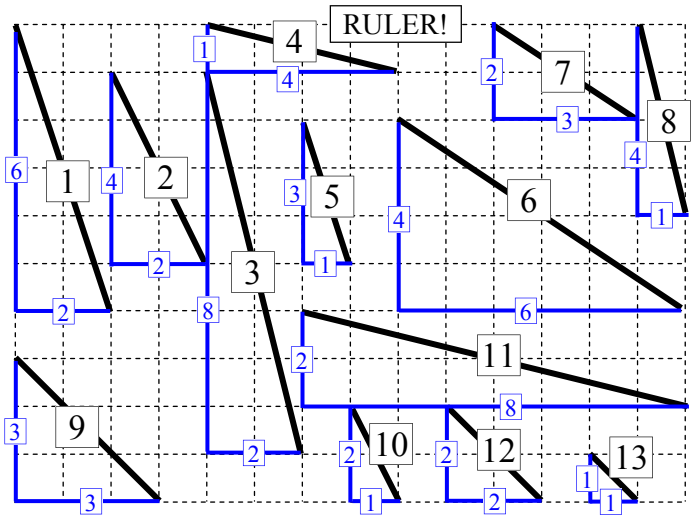


Create 'gradient triangles' and write the 'rise' and the 'run' on each triangle, all positive numbers. Find the gradient and write a negative sign '-' in front of your answer.

1 $m = \frac{6}{2} = -3$

2 $m = \frac{4}{2} = -2$

3 $m = \frac{8}{2} = -4$

4 $m = \frac{-1}{4}$

5 $m = \frac{3}{1} = -3$

6 $m = \frac{4}{6} = \frac{-2}{3}$

7 $m = \frac{-2}{3}$

8 $m = \frac{4}{1} = -4$

9 $m = \frac{3}{3} = -1$

10 $m = \frac{2}{1} = -2$

11 $m = \frac{2}{8} = \frac{-1}{4}$

12 $m = \frac{2}{2} = -1$

13 $m = \frac{1}{1} = -1$

14 Which of the intervals are parallel?

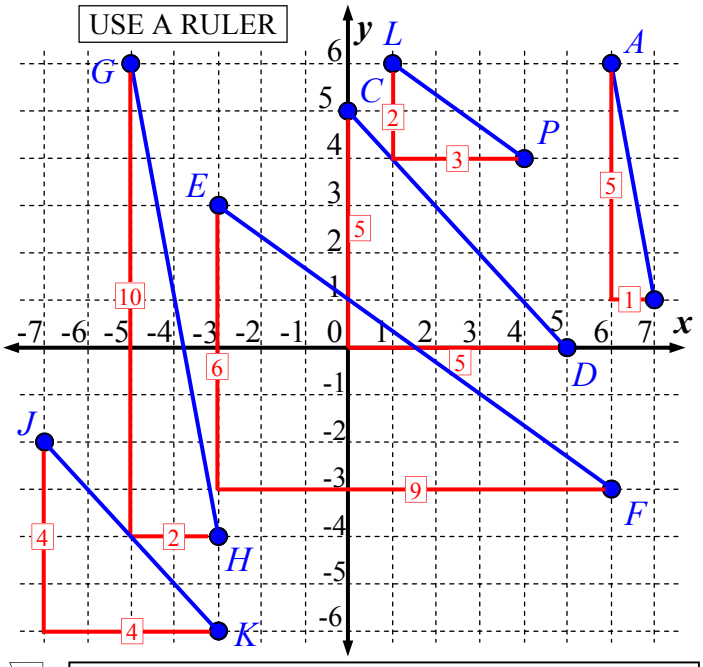
a) Q1 || Q 5

b) Q2 || Q 10

c) Q3 || Q 8

d) Q4 || Q 11

e) Q9 || Q 12 || Q 13



Plot the coordinates, then join them with an interval. Calculate the gradient for the interval by creating a gradient triangle. **Use positive numbers** on the gradient triangles, but final answers will be negative.

15 A (6, 6) and B (7, 1). $m = \frac{5}{1} = -5$

16 C (0, 5) and D (5, 0). $m = \frac{5}{5} = -1$

17 E (-3, 3) and F (6, -3). $m = \frac{6}{9} = \frac{-2}{3}$

18 G (-5, 6) and H (-3, -4). $m = \frac{10}{2} = -5$

19 J (-7, -2) and K (-3, -6). $m = \frac{4}{4} = -1$

20 L (1, 6) and P (4, 4). $m = \frac{-2}{3}$

21 Which of the intervals are parallel? Use the letters on the interval to complete these:

AB || GH EF || LP JK || CD

Cartesian Plane - Introduction to Gradient (Homework Strip)

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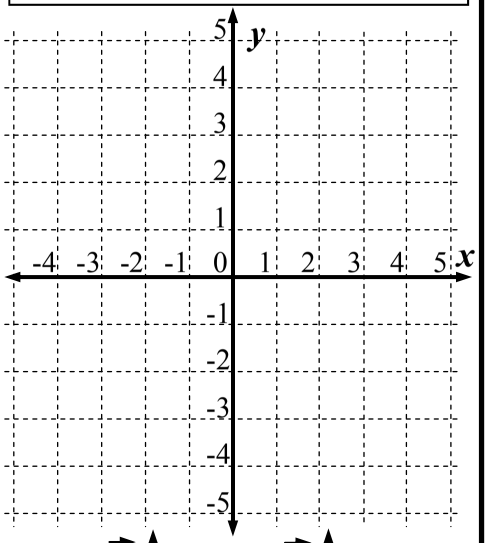
Date Due: _____

Plot and label the points, construct an interval and find its gradient.



1 $A\ (2, 2)$ and $B\ (5, 4)$.

$$m = \frac{\square}{\square}$$

2 $E\ (-3, -4)$ and $F\ (-1, 4)$.

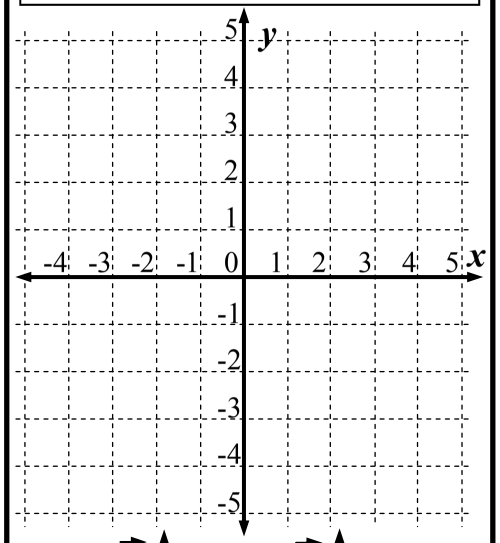
$$m = \frac{\square}{\square} = \square$$

3 $T\ (5, -1)$ and $V\ (1, -5)$.

$$m = \frac{\square}{\square} = \square$$

Date Due: _____

Plot and label the points, construct an interval and find its gradient.



1 $A\ (2, 2)$ and $B\ (5, 4)$.

$$m = \frac{\square}{\square}$$

2 $E\ (-3, -4)$ and $F\ (-1, 4)$.

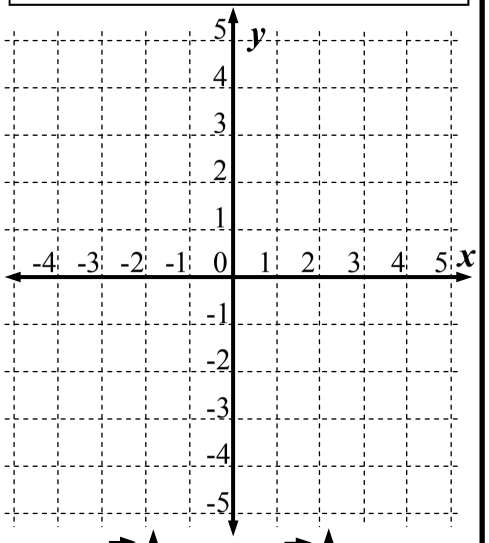
$$m = \frac{\square}{\square} = \square$$

3 $T\ (5, -1)$ and $V\ (1, -5)$.

$$m = \frac{\square}{\square} = \square$$

Date Due: _____

Plot and label the points, construct an interval and find its gradient.



1 $A\ (2, 2)$ and $B\ (5, 4)$.

$$m = \frac{\square}{\square}$$

2 $E\ (-3, -4)$ and $F\ (-1, 4)$.

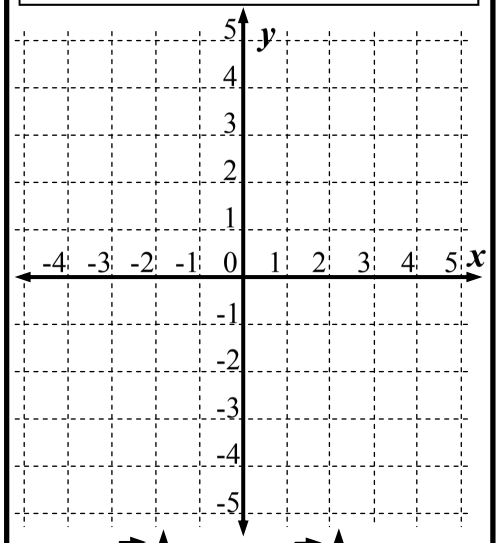
$$m = \frac{\square}{\square} = \square$$

3 $T\ (5, -1)$ and $V\ (1, -5)$.

$$m = \frac{\square}{\square} = \square$$

Date Due: _____

Plot and label the points, construct an interval and find its gradient.



1 $A\ (2, 2)$ and $B\ (5, 4)$.

$$m = \frac{\square}{\square}$$

2 $E\ (-3, -4)$ and $F\ (-1, 4)$.

$$m = \frac{\square}{\square} = \square$$

3 $T\ (5, -1)$ and $V\ (1, -5)$.

$$m = \frac{\square}{\square} = \square$$

Cartesian Plane - Introduction to Gradient (Homework Strip)

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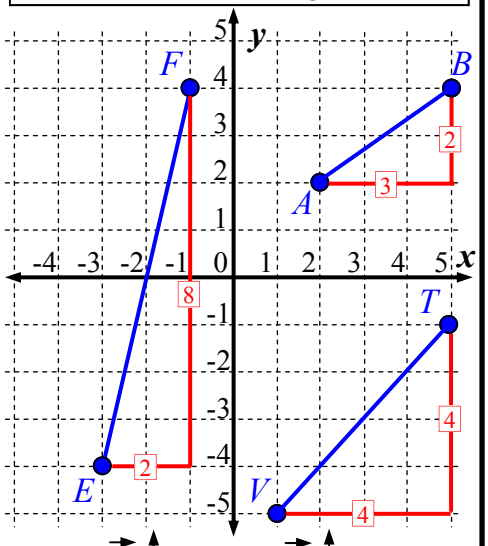
Date Due:

Plot and label the points, construct an interval and find its gradient.



1 $A\ (2, 2)$ and $B\ (5, 4)$.

$$m = \frac{2}{3}$$

2 $E\ (-3, -4)$ and $F\ (-1, 4)$.

$$m = \frac{8}{2} = 4$$

3 $T\ (5, -1)$ and $V\ (1, -5)$.

$$m = \frac{4}{4} = 1$$

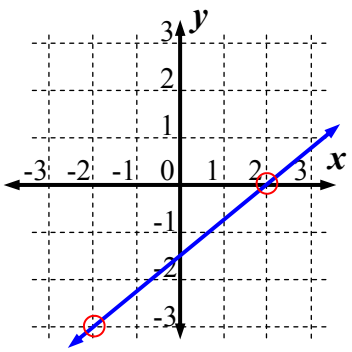
Cartesian Plane - Gradient

Gradient is a measure of slope. So the larger the number, the steeper the line is. A gradient of 5 is much steeper than a gradient of 1. Gradient is found creating a 'gradient triangle' and measuring the rise over the run, the vertical length over the horizontal. Gradient is given the symbol '*m*', it has nothing to do with the midpoint.

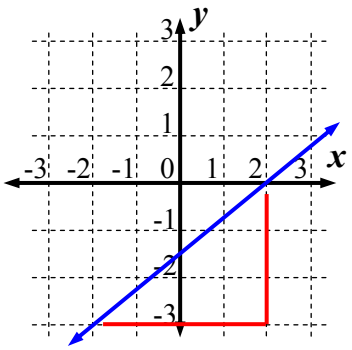
$$m = \frac{Rise}{Run} = \frac{Vertical\ Distance}{Horizontal\ Distance}$$

Here is an example of finding the gradient.

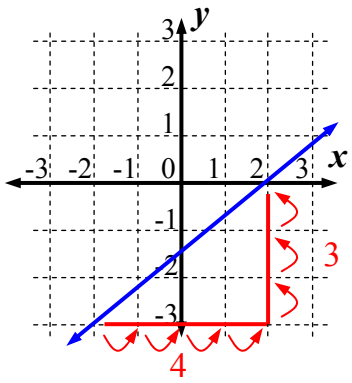
Example: Find the gradient of the line below.



Locate where the line cuts through exact coordinates. (in red)



Construct a gradient triangle, which is a right angle triangle with the line as the hypotenuse



Count and mark the rise and the run on the sides of the triangle.

$$m = \frac{3}{4}$$

Find the gradient by writing the rise over the run. Then finally, check if it is a positive or negative slope.

The process for finding the gradient is straight forward. The only issue is you can have positive and negative gradient. Positive Gradient 'Goes up to the right', Negative Gradient' goes 'up to the left'.

Positive Gradient goes up to the right

Negative Gradient goes up to the left

If the line is flat, it has a gradient of zero ($m = 0$). If the line is vertical (straight up and down), it has a gradient that is undefined (m = undef).

Cartesian Plane - Gradient (Sheet 1)

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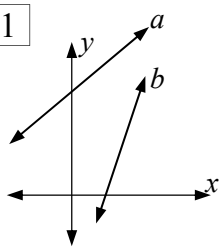
State whether the following have a positive or negative gradient.

Up to the left is -ve

Up to the right is +ve

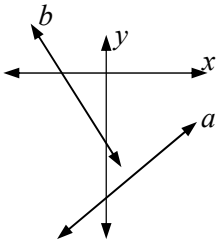
1



a) _____ Positive or Negative

b) _____ Positive or Negative

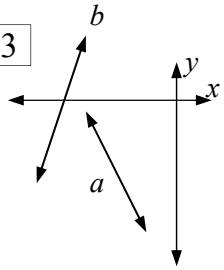
2



a) _____

b) _____

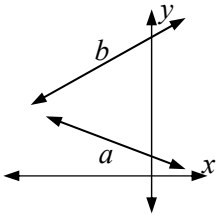
3



a) _____

b) _____

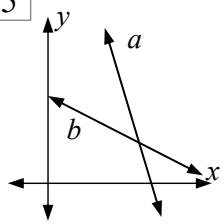
4



a) _____

b) _____

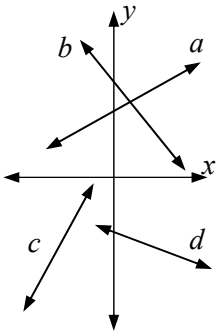
5



a) _____

b) _____

6



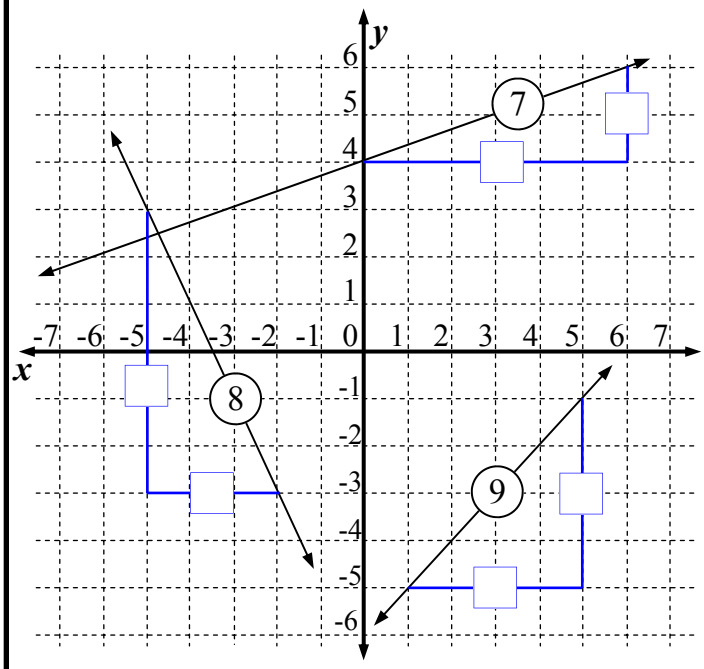
a) _____

b) _____

c) _____

d) _____

These lines have gradient triangles installed! Write the rise and run in the boxes on the triangles sides, then find the gradient. Make sure you remember to check for positive and negative gradient at the end.



7 $m = \frac{\square}{\square} = \frac{\square}{\square}$

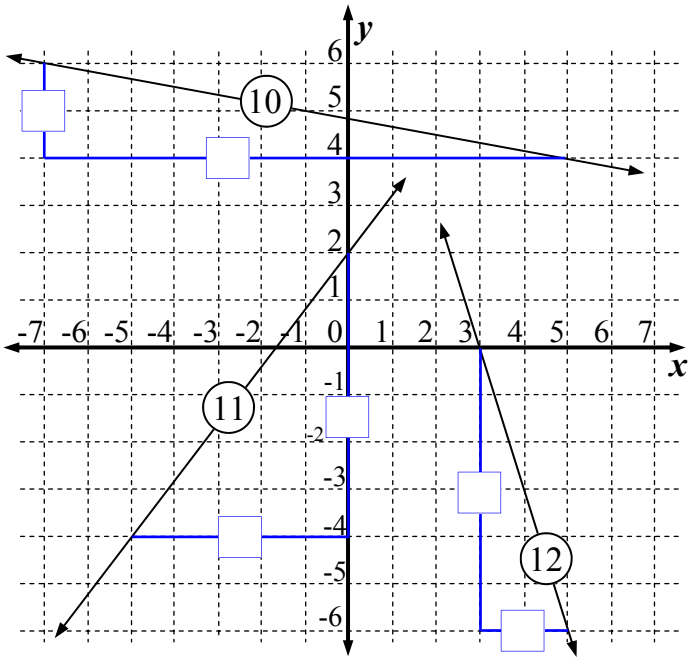
8 $m = \frac{\square}{\square} = \square$

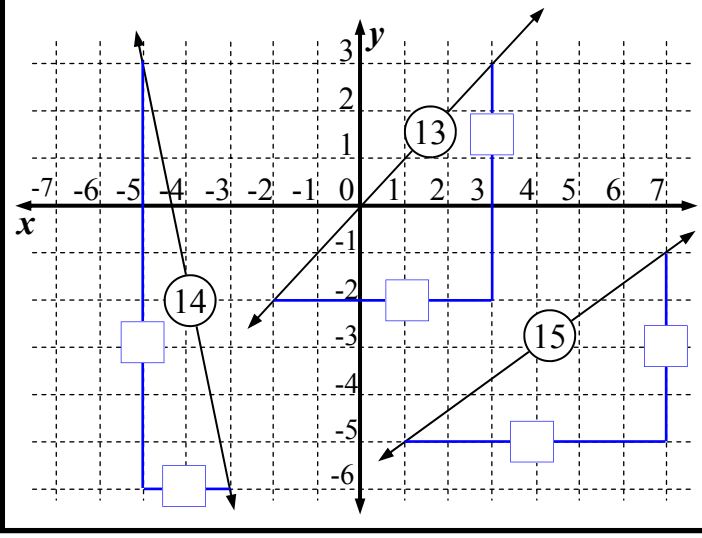
9 $m = \frac{\square}{\square} = \square$

10 $m = \frac{\square}{\square} = \frac{\square}{\square}$

11 $m = \frac{\square}{\square}$

12 $m = \frac{\square}{\square} = \square$





13 $m = \frac{\square}{\square} = \square$

14 $m = \frac{\square}{\square}$

15 $m = \frac{\square}{\square} = \frac{\square}{\square}$

Cartesian Plane - Gradient (Sheet 2)

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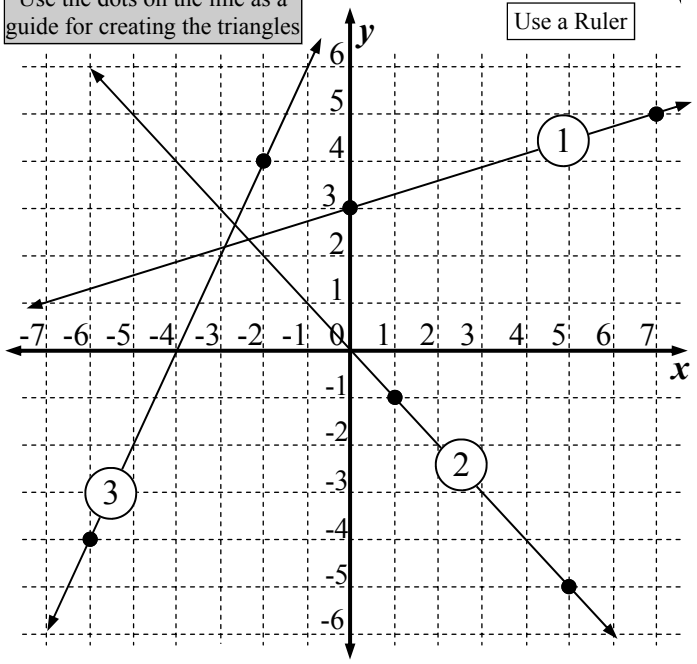
Find the gradient for these lines. Create gradient triangles and remember your positive and negatives.

Use the dots on the line as a guide for creating the triangles

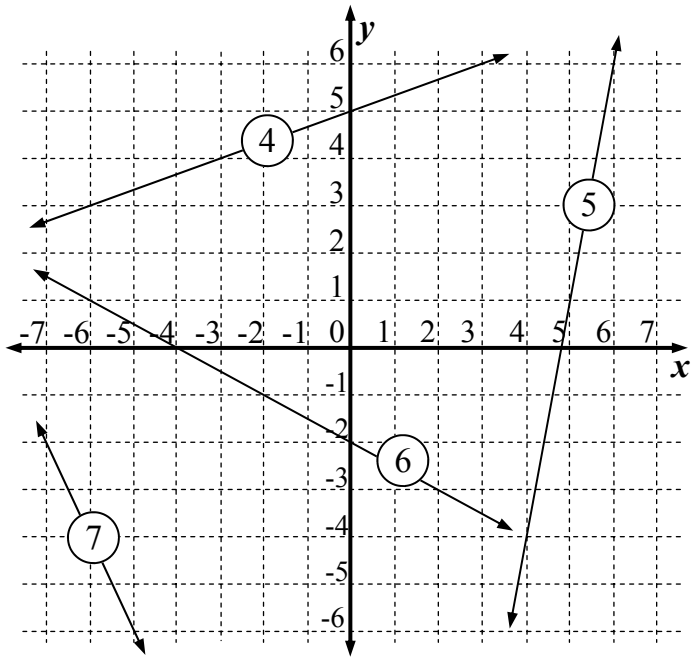
Use a Ruler



1 $m = \frac{\square}{\square}$

2 $m = \frac{\square}{\square} = \square$

3 $m = \frac{\square}{\square} = \square$

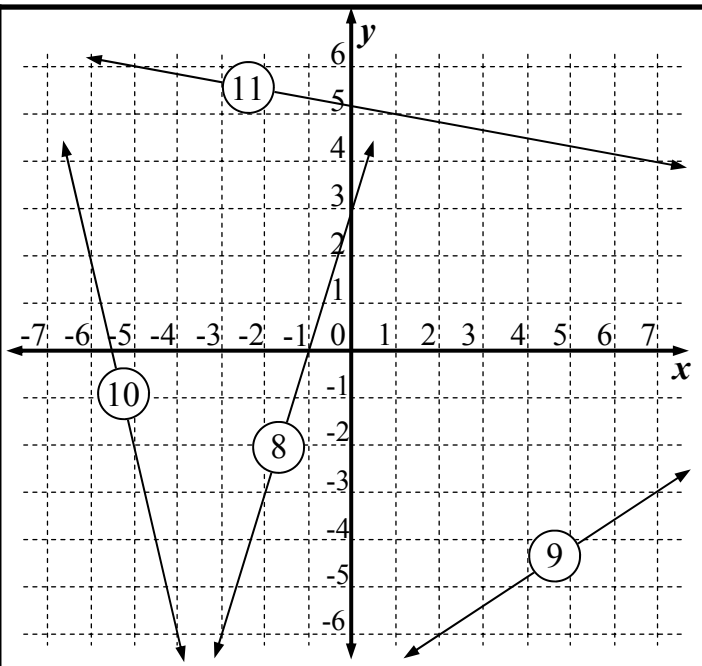


4 $m = \frac{\square}{\square} = \frac{\square}{\square}$

5 $m = \frac{\square}{\square} = \square$

6 $m = \frac{\square}{\square} = \frac{\square}{\square}$

7 $m = \frac{\square}{\square} = \square$

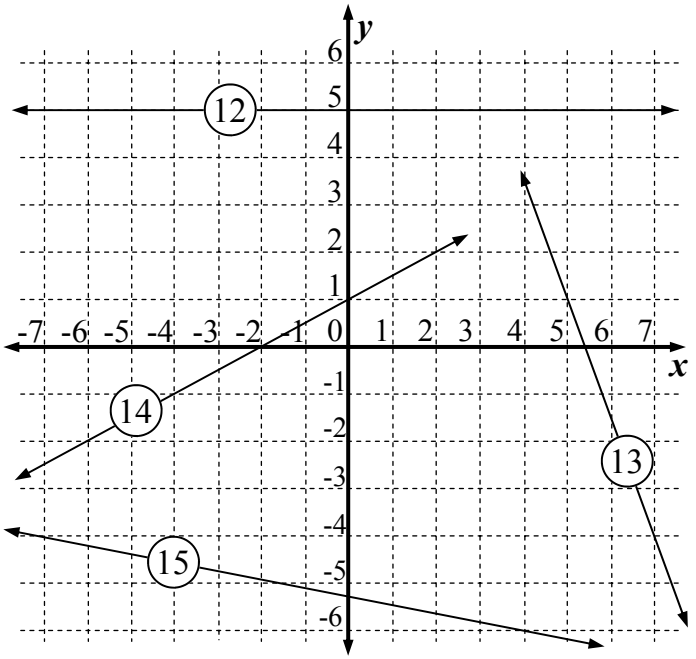


8 $m =$ _____

9 $m =$ _____

10 _____

11 _____



12 _____

13 _____

14 _____

15 _____

Cartesian Plane - Gradient (Sheet 1)

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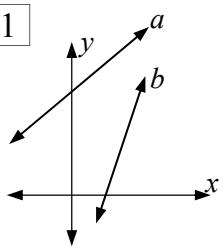
State whether the following have a positive or negative gradient.

Up to the left is -ve

Up to the right is +ve

1



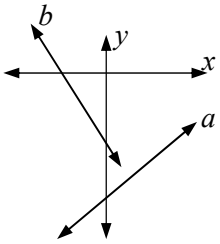
a) Positive

Positive or Negative

b) Positive

Positive or Negative

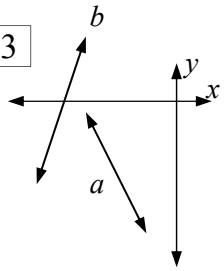
2



a) Positive

b) Negative

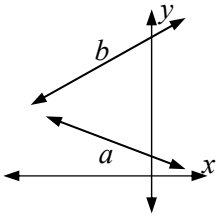
3



a) Negative

b) Positive

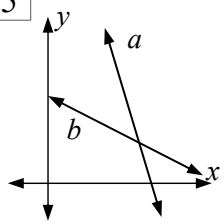
4



a) Negative

b) Positive

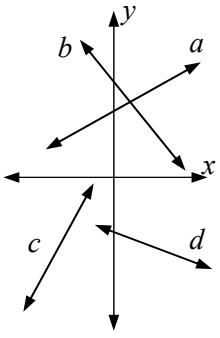
5



a) Negative

b) Negative

6



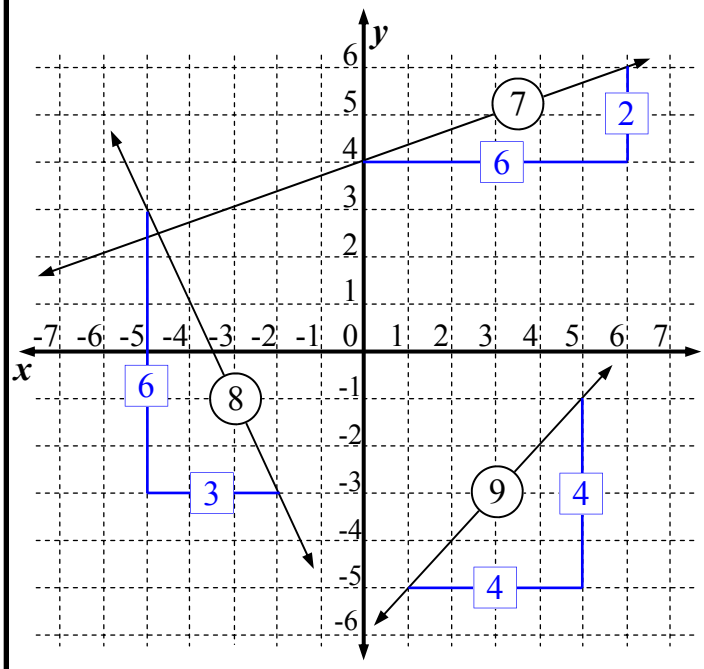
a) Positive

b) Negative

c) Positive

d) Negative

These lines have gradient triangles installed! Write the rise and run in the boxes on the triangles sides, then find the gradient. Make sure you remember to check for positive and negative gradient at the end.



7 $m = \frac{2}{6} = \frac{1}{3}$

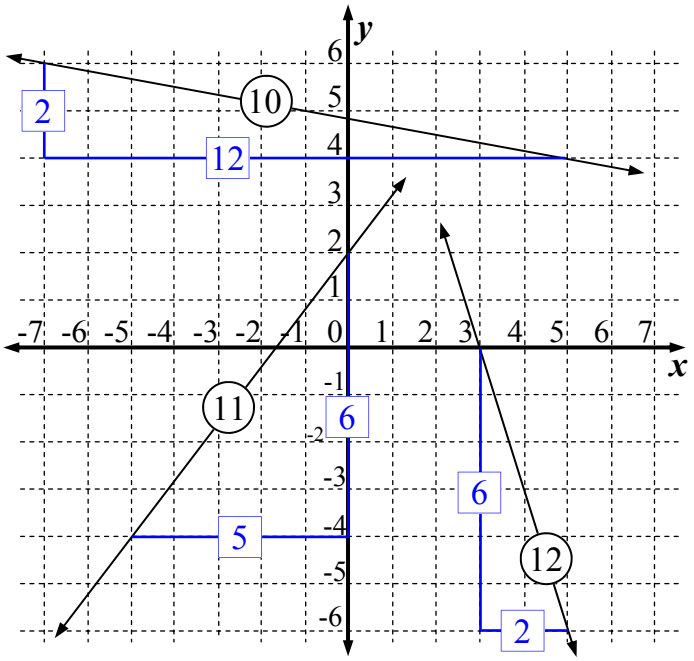
8 $m = \frac{6}{3} = -2$

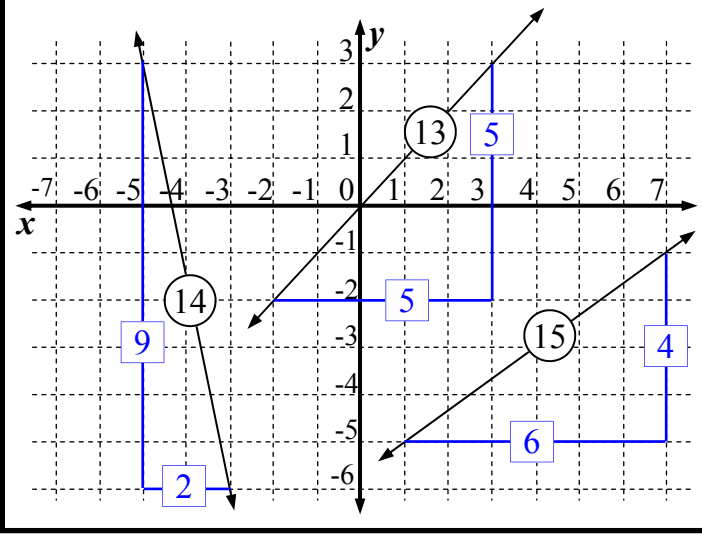
9 $m = \frac{4}{4} = 1$

10 $m = \frac{2}{12} = \frac{-1}{6}$

11 $m = \frac{6}{5}$

12 $m = \frac{6}{2} = -3$





13 $m = \frac{5}{5} = 1$

14 $m = \frac{-9}{2}$

15 $m = \frac{4}{6} = \frac{2}{3}$

Cartesian Plane - Gradient (Sheet 2)

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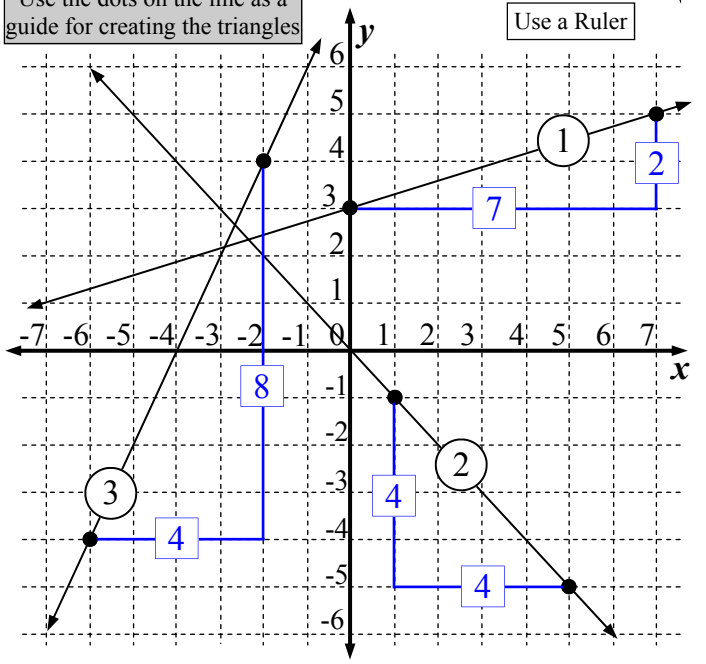
Find the gradient for these lines. Create gradient triangles and remember your positive and negatives.

Use the dots on the line as a guide for creating the triangles

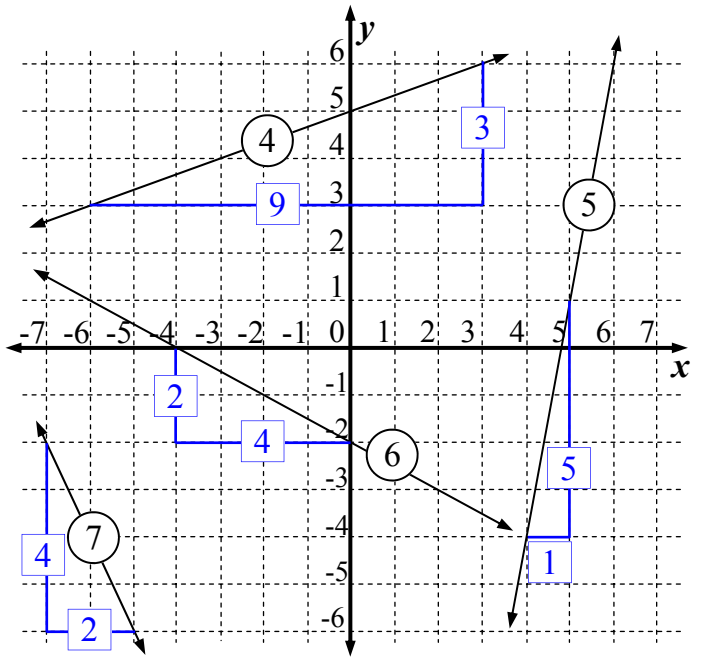
Use a Ruler



1 $m = \frac{2}{7}$

2 $m = \frac{4}{4} = -1$

3 $m = \frac{8}{4} = 2$

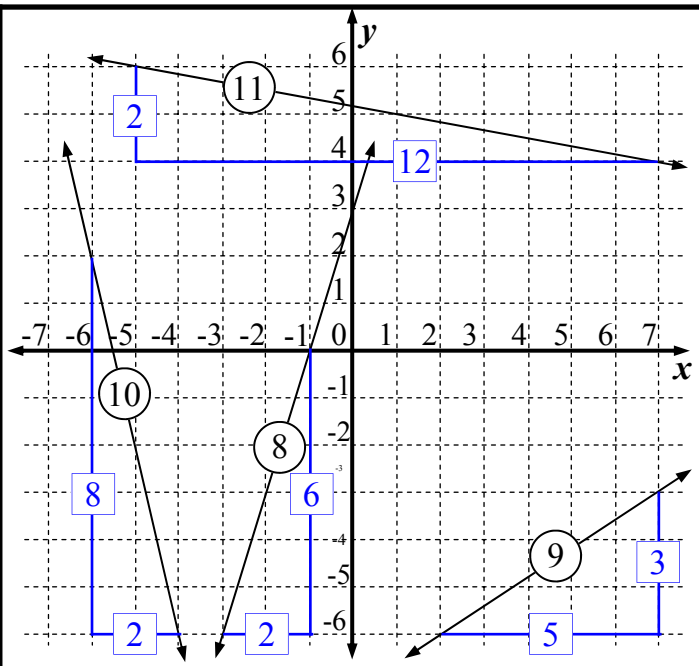


4 $m = \frac{3}{9} = \frac{1}{3}$

5 $m = \frac{5}{1} = 5$

6 $m = \frac{2}{4} = \frac{-1}{2}$

7 $m = \frac{4}{2} = -2$

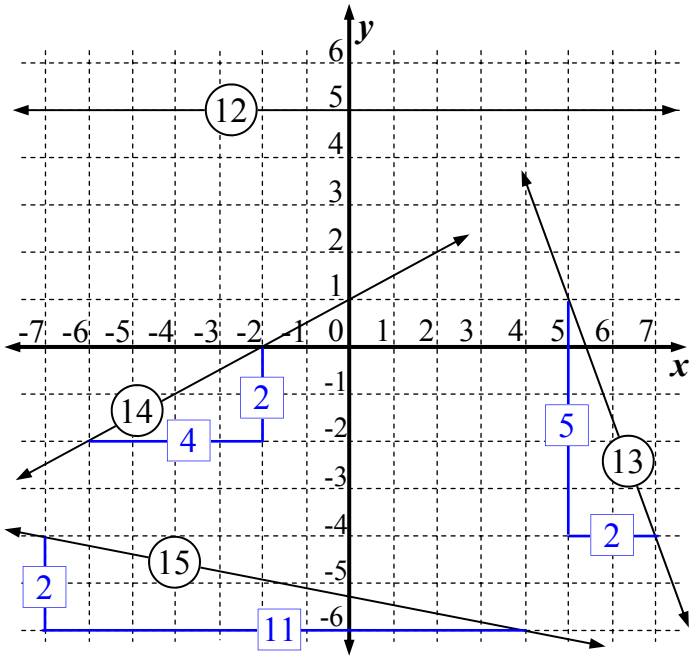


8 $m = \frac{6}{2} = 3$

9 $m = \frac{3}{5}$

10 $m = \frac{8}{2} = -4$

11 $m = \frac{2}{12} = \frac{-1}{6}$



12 $m = 0$

13 $m = \frac{-5}{2}$

14 $m = \frac{2}{4} = \frac{1}{2}$

15 $m = \frac{-2}{11}$

Cartesian Plane - Gradient (Homework Strip)

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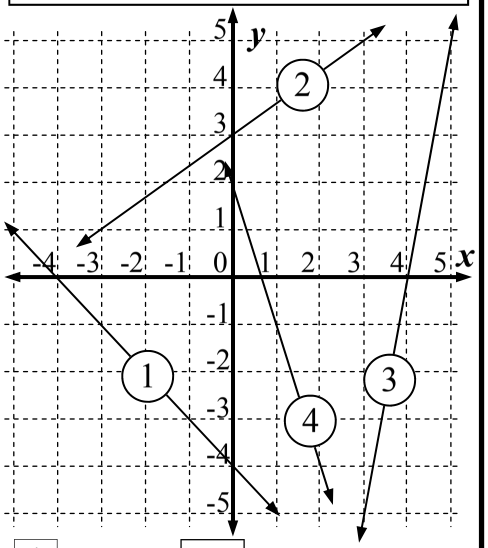
Date Due:

Find the gradient for these four lines.
Remember positive/negative gradient.



1 $m = \frac{\square}{\square} = \square$ Positive or negative?

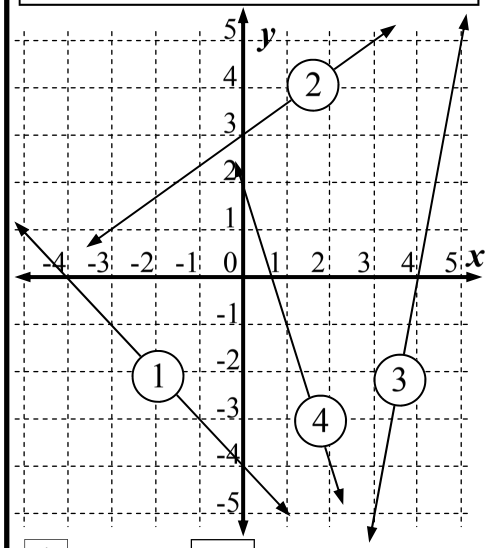
2 $m = \frac{\square}{\square} = \frac{\square}{\square}$ You might not need these boxes

3 $m = \frac{\square}{\square} = \square$

4 $m = \frac{\square}{\square} = \square$

Date Due:

Find the gradient for these four lines.
Remember positive/negative gradient.



1 $m = \frac{\square}{\square} = \square$ Positive or negative?

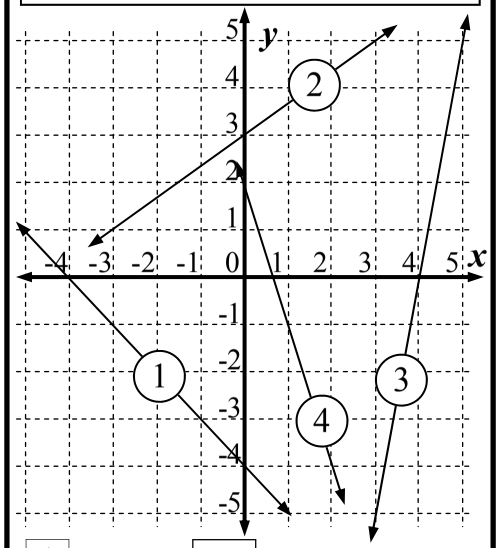
2 $m = \frac{\square}{\square} = \frac{\square}{\square}$ You might not need these boxes

3 $m = \frac{\square}{\square} = \square$

4 $m = \frac{\square}{\square} = \square$

Date Due:

Find the gradient for these four lines.
Remember positive/negative gradient.



1 $m = \frac{\square}{\square} = \square$ Positive or negative?

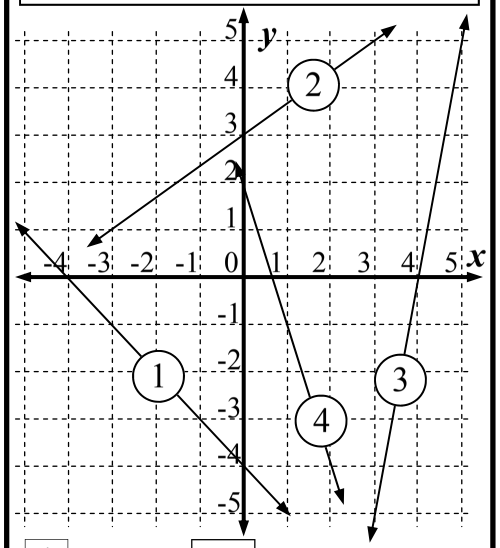
2 $m = \frac{\square}{\square} = \frac{\square}{\square}$ You might not need these boxes

3 $m = \frac{\square}{\square} = \square$

4 $m = \frac{\square}{\square} = \square$

Date Due:

Find the gradient for these four lines.
Remember positive/negative gradient.



1 $m = \frac{\square}{\square} = \square$ Positive or negative?

2 $m = \frac{\square}{\square} = \frac{\square}{\square}$ You might not need these boxes

3 $m = \frac{\square}{\square} = \square$

4 $m = \frac{\square}{\square} = \square$

Cartesian Plane - Gradient (Homework Strip)

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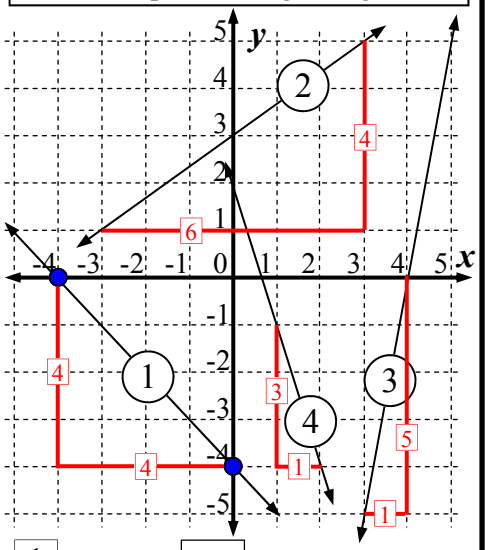
Date Due:

Find the gradient for these four lines.
Remember positive/negative gradient.



1 $m = \frac{4}{4} = -1$ Positive or negative?

2 $m = \frac{4}{6} = \frac{2}{3}$ You might not need these boxes

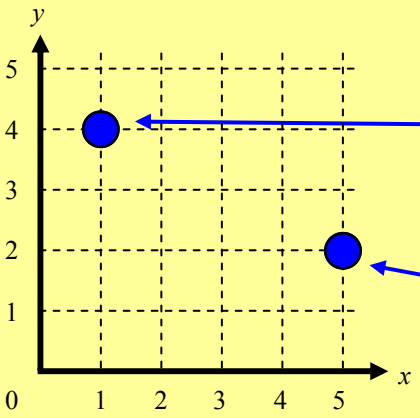
3 $m = \frac{5}{1} = 5$

4 $m = \frac{3}{1} = -3$

Cartesian Plane - Distance (Positive Quadrant)

This sheet uses Pythagoras Theorem to find the distance between two points. When two points are plotted on a cartesian plane a triangle can be created after a third point is plotted. The steps are shown below.

Example (1, 4) and (5, 2).

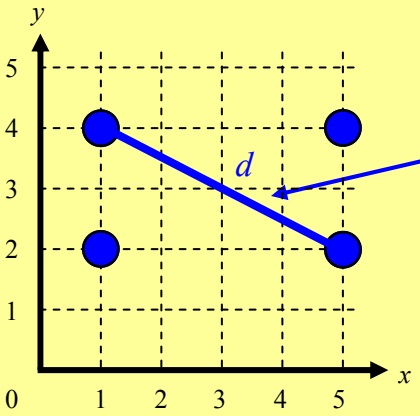


STEP 1

Plot point (1, 4). From the origin (0,0) move across 1 and up 4. Plot the point.

STEP 2

Plot point (5, 2). From the origin (0,0) move across 5 and up 2. Plot the point.

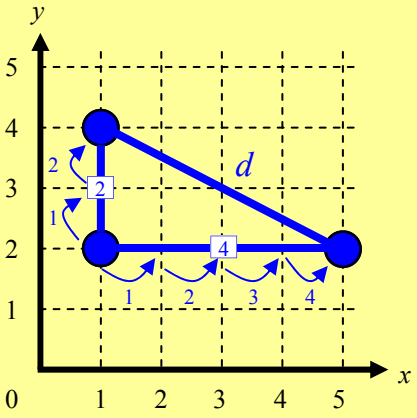


STEP 3

Draw a line between the two points, call its length '*d*'.

STEP 4

Now plot a point to form a right-angle triangle. It can be in either of the two positions shown. (Not both).



STEP 5

Construct the two short sides of the triangle.

STEP 6

Count off the lengths to find the length of both of the short sides. In the example one side is 2 units, the other is 4 units.

STEP 7

Now apply Pythagoras Theorem to the triangle to find the hypotenuse. Answer to 1 d.p. and the length is in 'units'.

$d^2 = 2^2 + 4^2$

$d^2 = 20$

$d = \sqrt{20}$

$d = 4.5$ units (1 d.p.)

Cartesian Plane - Distance - Positive Quadrant (Sheet 1)

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Calculate these square roots, round your answer to 1 d.p.

1 $\sqrt{43} =$ ☐.☐ Round to 1 d.p.

Calc: √ 4 3 =

2 $\sqrt{28} =$ ☐

3 $\sqrt{75} =$ ☐

4 $\sqrt{66} =$ ☐

5 $\sqrt{59} =$ ☐

Calculate the additions of two squared numbers.

6 $8^2 + 4^2 =$ ☐

Calc: 8 x^2 + 4 x^2 =

7 $5^2 + 7^2 =$ ☐

8 $6^2 + 3^2 =$ ☐

9 $4^2 + 10^2 =$ ☐

10 $2^2 + 8^2 =$ ☐

Combine the two operations. Add the squares and square root the answer.

11 $8^2 + 5^2 =$ ☐

Get your answer, then write it here

$\sqrt{\square} =$ ☐

Calc:

Then square root (1 d.p.) √ ANS =

12 $4^2 + 9^2 =$ ☐

$\sqrt{\square} =$ ☐

13 $1^2 + 7^2 =$ ☐

$\sqrt{\square} =$ ☐

14 $6^2 + 6^2 =$ ☐

$\sqrt{\square} =$ ☐

Now use Pythagoras Theorem to calculate the length of an interval. Use 'd' to represent the distance between the two plotted points. (1 d.p.)

15

$d^2 = \square^2 + \square^2$

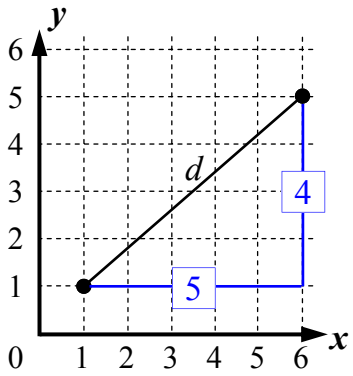
$d^2 = \square$

$d = \sqrt{\square}$ Rewrite

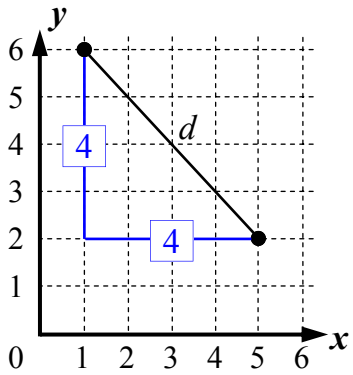
Calc: √ ANS =

$d =$ ☐.☐ *units*

(1 d.p.)



16



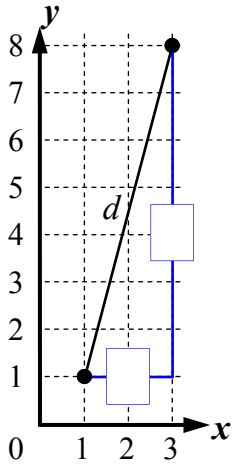
$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d =$ ☐ *units*

17



Now write the side lengths in the boxes.

$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d =$ ☐ *units*

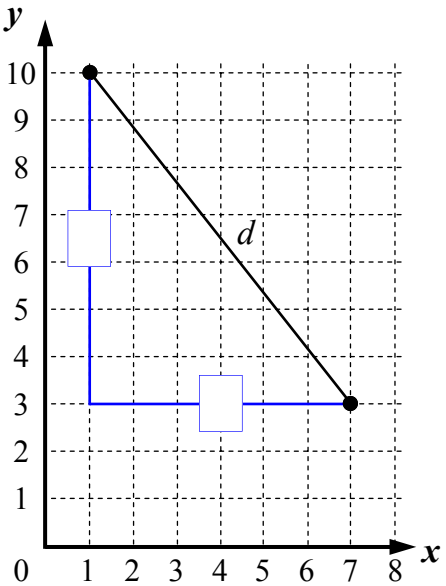
18

$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d =$ ☐ *units*



Cartesian Plane - Distance - Positive Quadrant (Sheet 2)

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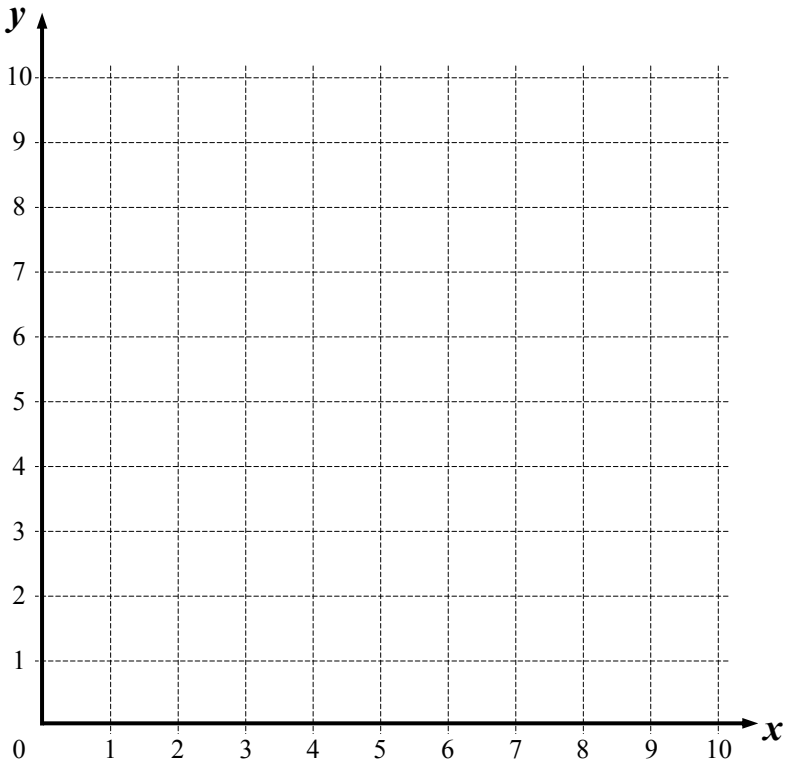
Plot the two points on the graph and rule an interval between them. This will be the hypotenuse of a right angle triangle. Draw the two short sides then use Pythagoras to find the interval length. (1 d.p.)



1 (7, 10) and (10, 6). Plot right angle at (10, 10).

$d^2 = \square^2 + \square^2$

Calc: 3 x^2 + 4 x^2 =

$d^2 =$ ☐

Rewrite

$d = \sqrt{\square}$

Calc: $\sqrt{\blacksquare}$ ANS =

$d =$ ☐ *units*

(1 d.p.)

2 (6, 10) and (1, 9). Plot right angle at (1, 10).

$d^2 = \square^2 + \square^2$

$d^2 =$ ☐

$d = \sqrt{\square}$

$d =$ ☐ *units*

(1 d.p.)

3 (7, 10) and (9, 1). Plot right angle at (7, 1).

$d^2 = \square^2 + \square^2$

$d^2 =$ ☐

$d = \sqrt{\square}$

$d =$ ☐ *units*

4 (2, 4) and (0, 8). Plot right angle at (0, 4).

$d^2 =$

$d^2 =$

$d =$

$d =$

5 (4, 4) and (4, 8).

$d =$

Now you have place the right angle yourself. Find the distance 'd' between these two points.

6 (0, 2) and (7, 0).

Right angle at (☐ , ☐)

$d^2 =$

$d^2 =$

$d =$

$d =$

7 (2, 2) and (6, 9).

Right angle at (☐ , ☐)

8 (9, 5) and (10, 1).

Right angle at (☐ , ☐)

9 (1, 9) and (9, 5).

Right angle at (☐ , ☐)

Cartesian Plane - Distance - Positive Quadrant (Sheet 1)

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Calculate these square roots, round your answer to 1 d.p.

1 $\sqrt{43} = 6.6$ Round to 1 d.p.

Calc: √ 4 3 =

2 $\sqrt{28} = 5.3$

3 $\sqrt{75} = 8.7$

4 $\sqrt{66} = 8.1$

5 $\sqrt{59} = 7.7$

Calculate the additions of two squared numbers.

6 $8^2 + 4^2 = 80$

Calc: 8 x^2 + 4 x^2 =

7 $5^2 + 7^2 = 74$

8 $6^2 + 3^2 = 45$

9 $4^2 + 10^2 = 116$

10 $2^2 + 8^2 = 68$

Combine the two operations. Add the squares and square root the answer.

11 $8^2 + 5^2 = 89$

Get your answer, then write it here

$\sqrt{89} = 9.4$

Calc: Then square root (1 d.p.) √ ANS =

12 $4^2 + 9^2 = 97$

$\sqrt{97} = 9.8$

13 $1^2 + 7^2 = 50$

$\sqrt{50} = 7.1$

14 $6^2 + 6^2 = 72$

$\sqrt{72} = 8.5$

Now use Pythagoras Theorem to calculate the length of an interval. Use 'd' to represent the distance between the two plotted points. (1 d.p.)

15

$d^2 = 4^2 + 5^2$

$d^2 = 41$

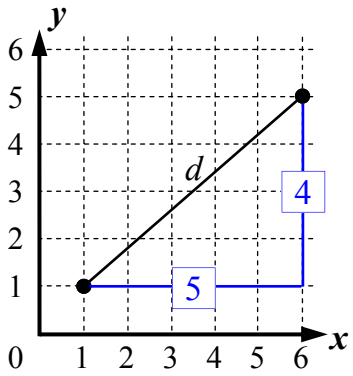
Rewrite

$d = \sqrt{41}$

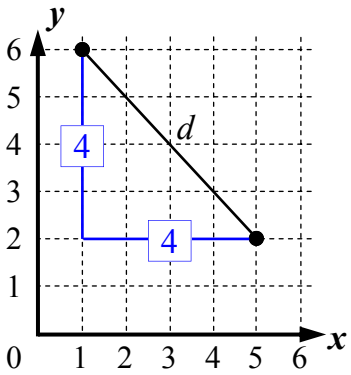
Calc: √ ANS =

$d = 6.4$ *units*

(1 d.p.)



16



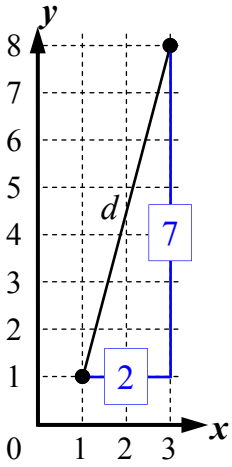
$d^2 = 4^2 + 4^2$

$d^2 = 32$

$d = \sqrt{32}$

$d = 5.7$ *units*

17



Now write the side lengths in the boxes.

$d^2 = 2^2 + 7^2$

$d^2 = 53$

$d = \sqrt{53}$

$d = 7.3$ *units*

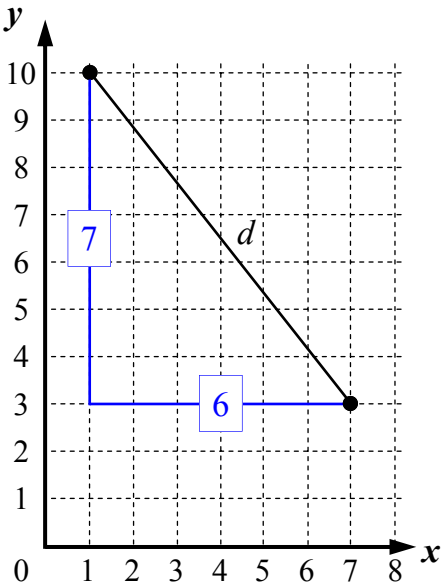
18

$d^2 = 6^2 + 7^2$

$d^2 = 85$

$d = \sqrt{85}$

$d = 9.2$ *units*



Cartesian Plane - Distance - Positive Quadrant (Sheet 2)

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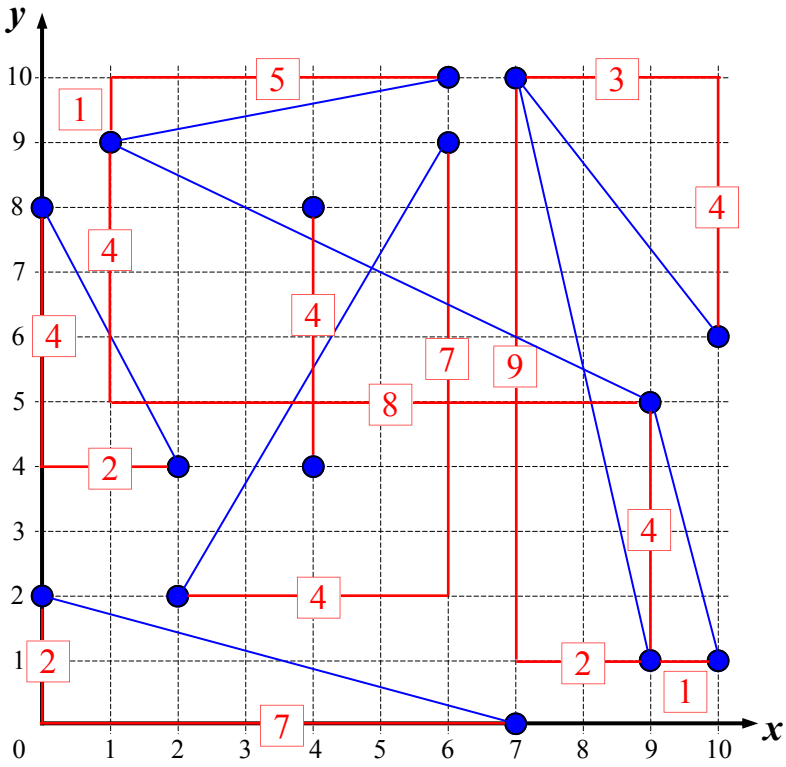
Plot the two points on the graph and rule an interval between them. This will be the hypotenuse of a right angle triangle. Draw the two short sides then use Pythagoras to find the interval length. (1 d.p.)



1 (7, 10) and (10, 6). Plot right angle at (10, 10).

$d^2 =$ 3 ^{2} + 4 ^{2}

Calc: 3 x^2 + 4 x^2 =

$d^2=$ 25

$d =$ $\sqrt{25}$ Rewrite

Calc: $\sqrt{\blacksquare}$ ANS =

$d =$ 5.0 *units*

(1 d.p.)

2 (6, 10) and (1, 9). Plot right angle at (1, 10).

$d^2 =$ 1 ^{2} + 5 ^{2}

$d^2 =$ 26

$d =$ $\sqrt{26}$

$d =$ 5.1 *units*

(1 d.p.)

3 (7, 10) and (9, 1). Plot right angle at (7, 1).

$d^2 =$ 2 ^{2} + 9 ^{2}

$d^2 =$ 85

$d =$ $\sqrt{85}$

$d =$ 9.2 *units*

4 (2, 4) and (0, 8). Plot right angle at (0, 4).

$d^2 = 2^2 + 4^2$

$d^2 = 20$

$d = \sqrt{20}$

$d = 4.5$ units

5 (4, 4) and (4, 8).

$d = 4$ units

Now you have place the right angle yourself. Find the distance 'd' between these two points.

6 (0, 2) and (7, 0).

Right angle at (0 , 0)

$d^2 = 2^2 + 7^2$ or (7, 2)

$d^2 = 53$

$d = \sqrt{53}$

$d = 7.3$ units

7 (2, 2) and (6, 9).

Right angle at (6 , 2)

$d^2 = 4^2 + 7^2$ or (2, 9)

$d^2 = 65$

$d = \sqrt{65}$

$d = 8.1$ units

8 (9, 5) and (10, 1).

Right angle at (9 , 1)

$d^2 = 1^2 + 4^2$ or (10, 5)

$d^2 = 17$

$d = \sqrt{17}$

$d = 4.1$ units

9 (1, 9) and (9, 5).

Right angle at (1 , 5)

$d^2 = 4^2 + 8^2$ or (9, 9)

$d^2 = 80$

$d = \sqrt{80}$

$d = 8.9$ units

Cartesian Plane - Distance - All Quadrants (Homework Strip)

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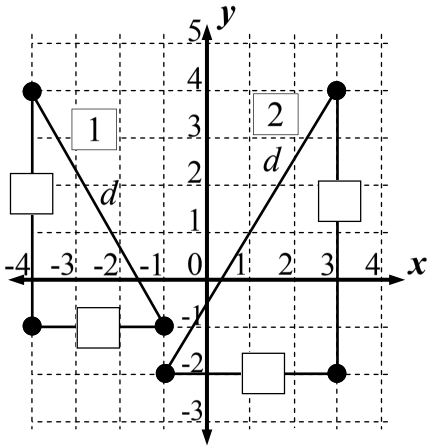
Date Due: _____

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

2 $d^2 = \square^2 + \square^2$

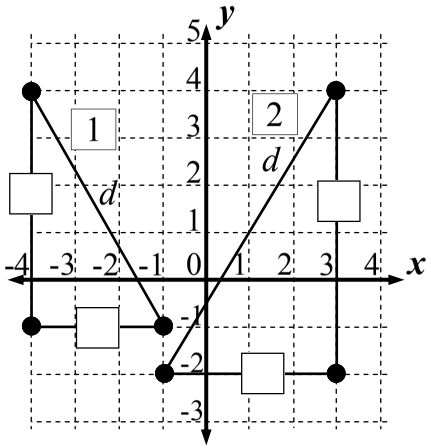
$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

Date Due: _____

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

2 $d^2 = \square^2 + \square^2$

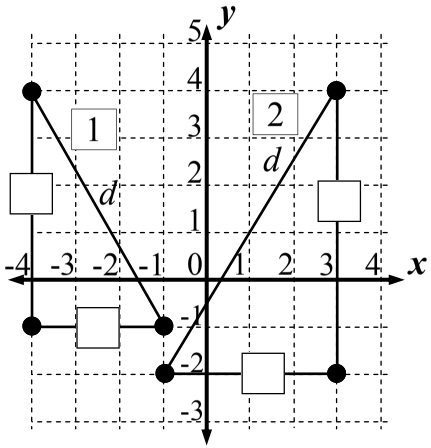
$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

Date Due: _____

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

2 $d^2 = \square^2 + \square^2$

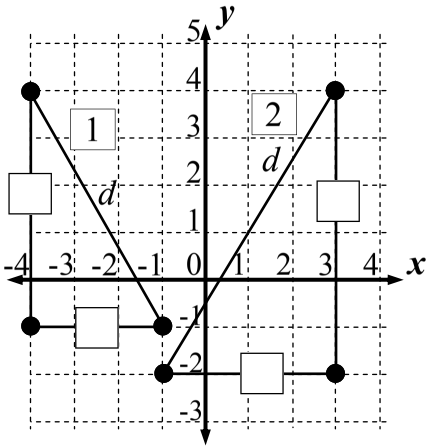
$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

Date Due: _____

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

2 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

Cartesian Plane - Distance - Positive Quadrant (Homework Strip)

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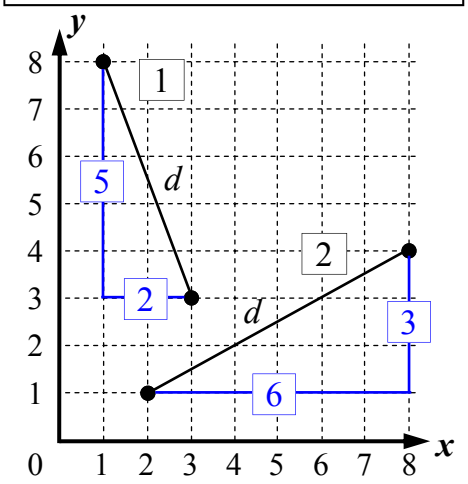
Date Due:

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = 2^2 + 5^2$

$d^2 = 29$

$d = \sqrt{29}$

$d = 5.4$ *units*

2 $d^2 = 3^2 + 6^2$

$d^2 = 45$

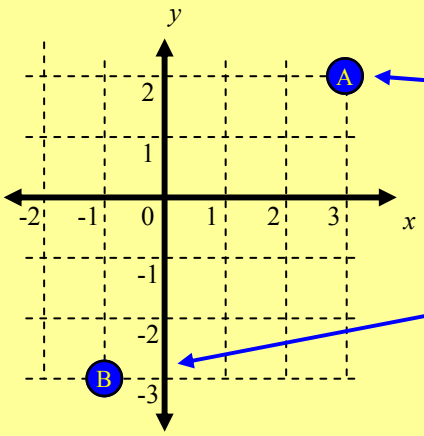
$d = \sqrt{45}$

$d = 6.7$ *units*

Cartesian Plane - Distance - All Quadrants

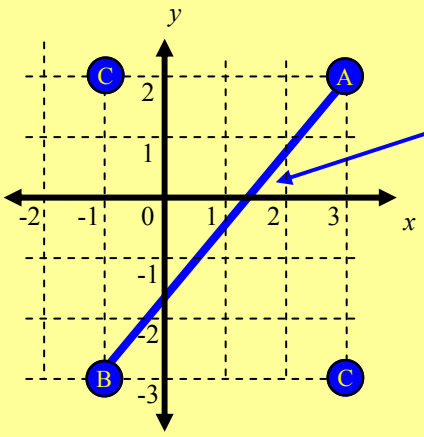
This sheet uses Pythagoras Theorem to find the distance between two points. When two points are plotted on a cartesian plane a right angle triangle can be created. It is assumed that the previous positive quadrant sheet is attempted prior to this sheet.

Example A (3, 2) and B (-1, -3). Label right angle C.



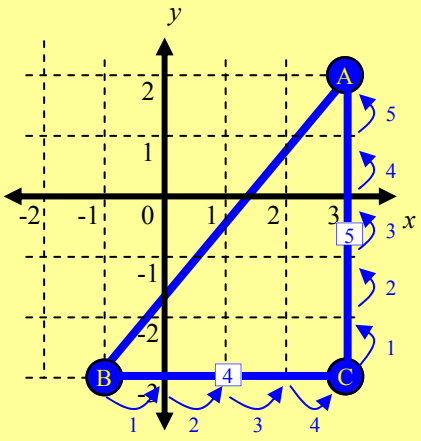
STEP 1 Plot point 'A', from the origin (0,0) move right, across 3, then up 2. Plot the point with an 'A' inside.

STEP 2 Plot point 'B', from the origin (0,0) move left across 1, to -1, and then down 3, to -3. Plot the point with an 'B' inside.



STEP 3 Draw a line between the two points

STEP 4 Now plot point 'C' to form a right-angle triangle. It can be in either of the two positions shown. Not both.



STEP 5 Construct the two short sides of the Triangle.

STEP 6 Count off the lengths to find the length of both of the short sides. In the example one side is 5 units, the other is 4 units.

STEP 7 Now apply Pythagoras Theorem to the triangle to find the hypotenuse. Answer to 1 d.p. and the length is in 'units'.

AC = 5

CB = 4

$AB^2 = 5^2 + 4^2$

$AB^2 = 41$

$AB = \sqrt{41}$

AB = 6.4 units (1 d.p.)

Cartesian Plane - Distance - All Quadrants (Sheet 1)

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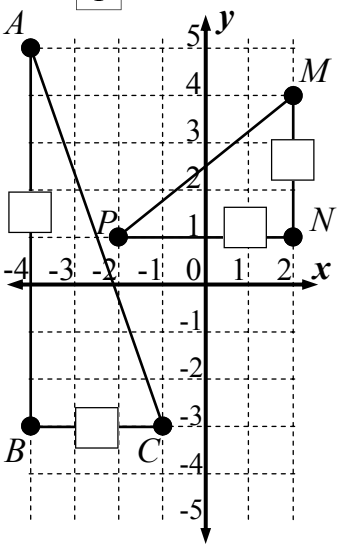
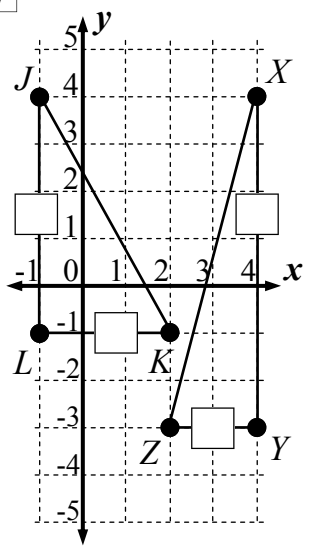
Write the lengths of the short sides in the boxes provided on the number plane.

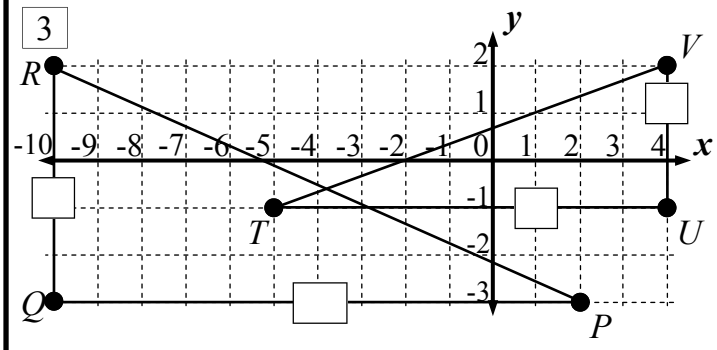
1



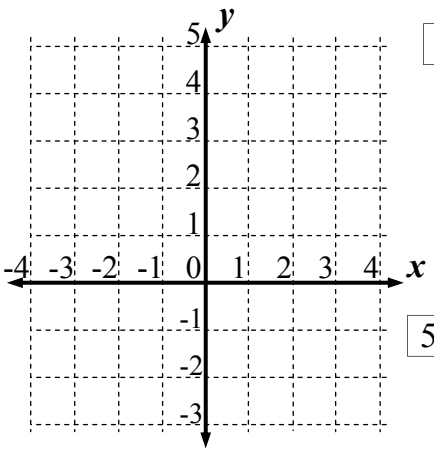
2



3



Plot the pair of points, then create a right angle triangle on the number plane. Find the two short side lengths. Plot Q4 and Q5 on the first number plane.



4 (4, 5) & (1, -3).

Vertical Length : ☐

Horizontal Length : ☐

5 (-3, 4) & (-1, -2).

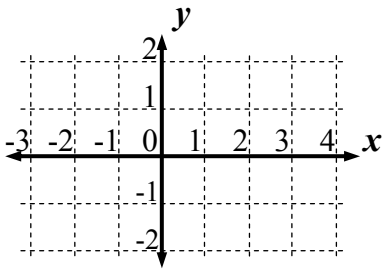
Vertical Length : ☐

Horizontal Length : ☐

6 (4, -2) & (-1, 2).

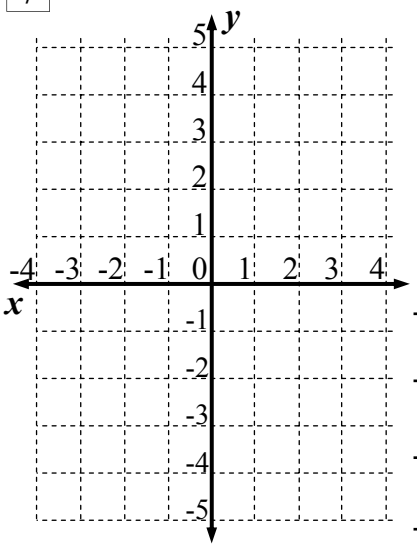
Vertical Length : ☐

Horizontal Length : ☐



Now use Pythagoras to calculate the distance between the two plotted points. Find the short side lengths first. Answer to 1 decimal place.

7



(3, 5) & (-1, -3).

Vertical Length : ☐

Horizontal Length : ☐

$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square.\square$ *units*

8 (-4, -4) & (2, 5).

Vertical Length : ☐

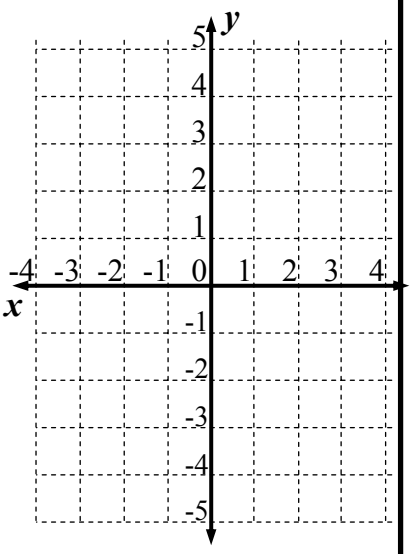
Horizontal Length : ☐

$d^2 = \square^2 + \square^2$

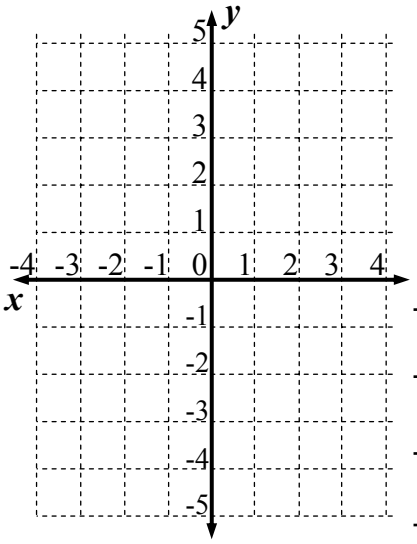
$d^2 = \square$

$d = \sqrt{\square}$

$d = \square\square.\square$ *units*



9



(-4, 2) & (1, -5).

Vertical Length : ☐

Horizontal Length : ☐

$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square.\square$ *units*

Cartesian Plane - Distance - All Quadrants (Sheet 2)

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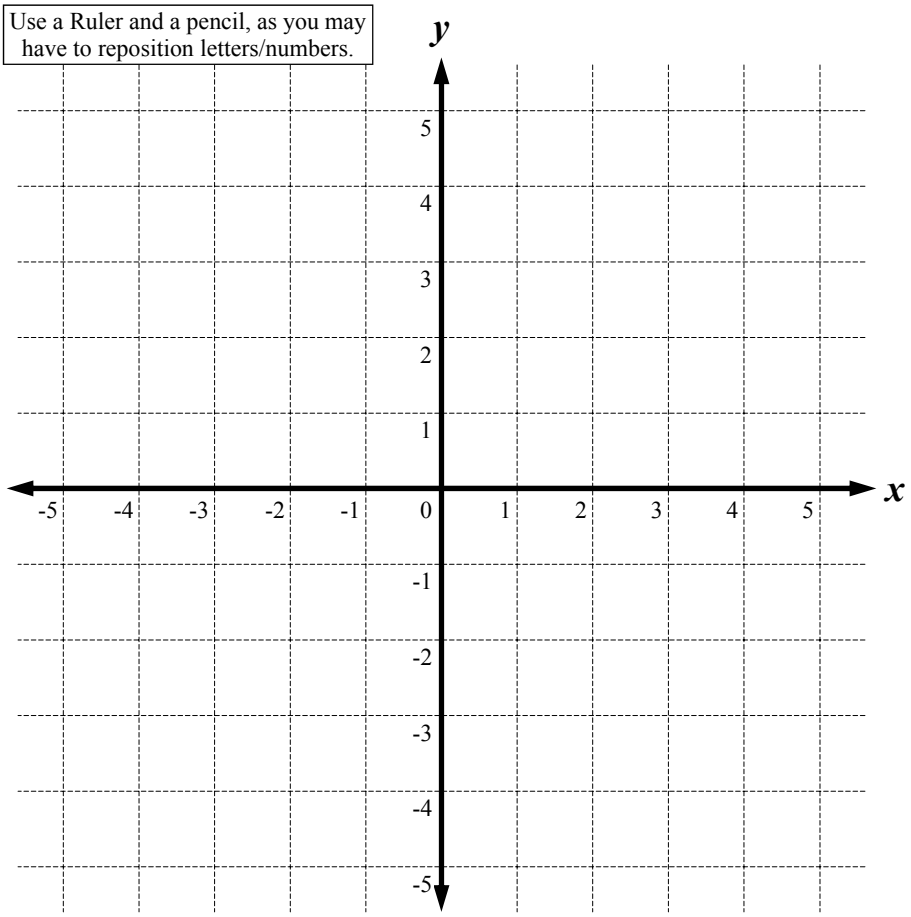
Plot the two points on the graph and draw a line between them, this is the hypotenuse. Draw the two short sides then apply Pythagoras to find the distance between the two points (to 1 d.p.). Note that '*u*' stands for units.

Use a Ruler and a pencil, as you may have to reposition letters/numbers.



1 *K* (-3, 3) and *L* (4, 5). Label right angle *J* at (4, 3).

JK = ☐ *u* *JL* = ☐ *u*

KL^2 = ☐^{2} + ☐^{2}

KL^2 = ☐

KL = $\sqrt{\square}$ Rewrite

KL = ☐.☐ *units*

2 *A* (-5, 4) & *B* (-3, -2). Label right angle *C* at (-5, -2).

AC = ☐ *u* *BC* = ☐ *u*

AB^2 = ☐^{2} + ☐^{2}

AB^2 = ☐

AB = $\sqrt{\square}$ Rewrite

AB = ☐.☐ *units*

3 *S* (-2, -4) and *R* (2, 2). Label right angle *T* at (2, -4).

TR = ☐ *u* *TS* = ☐ *u*

SR^2 =

SR^2 =

SR =

SR =

4 *V* (-5, -4) & *X* (-3, -3). Label right angle *Y* at (-3, -4).

VY = ☐ *u* *XY* = ☐ *u*

VX^2 =

VX^2 =

VX =

VX =

5 *F* (1, 5) & *T* (5, 1). Label right angle *N*.

FN = *TN* =

6 *U* (0, 5) & *Z* (5, -3). Label right angle *D*.

UD = *ZD* =

7 *E* (4, -2) & *G* (2, -5). Label right angle *H*.

EH = *GH* =

8 *M* (-2, 2) & *Q* (3, -1). Label right angle *P*.

MP = *QP* =

Cartesian Plane - Distance - All Quadrants (Sheet 1)

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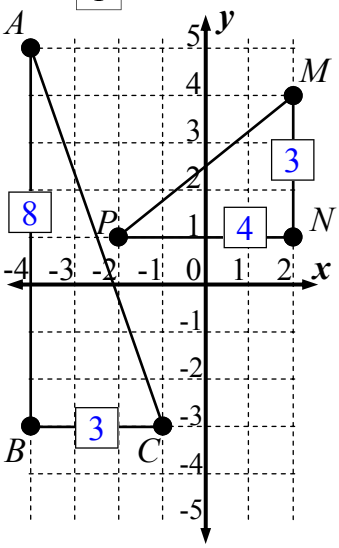
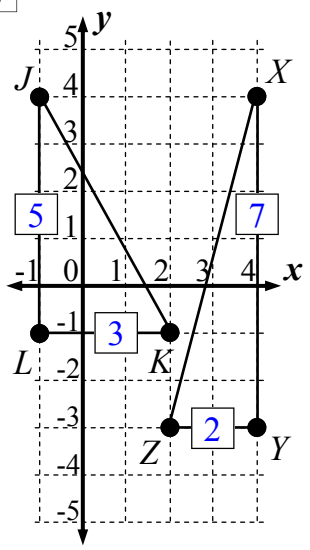
Write the lengths of the short sides in the boxes provided on the number plane.

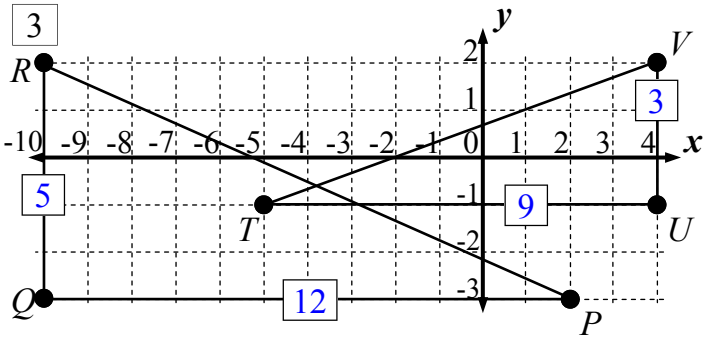
1



2

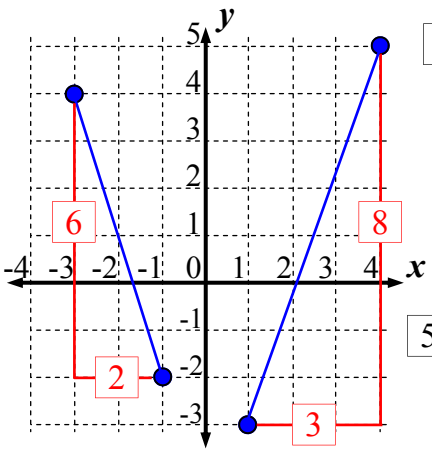


3



Plot the pair of points, then create a right angle triangle on the number plane. Find the two short side lengths. Plot Q4 and Q5 on the first number plane.

4 (4, 5) & (1, -3).



Vertical Length : 8

Horizontal Length : 3

5 (-3, 4) & (-1, -2).

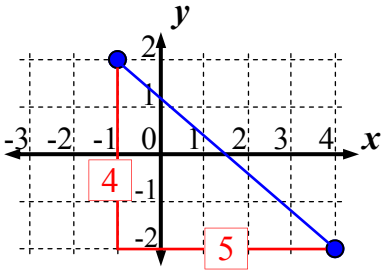
Vertical Length : 6

Horizontal Length : 2

6 (4, -2) & (-1, 2).

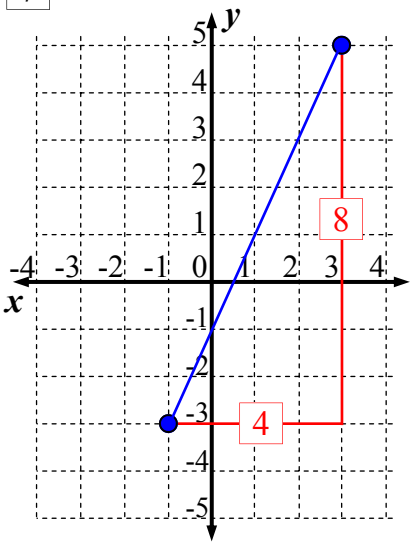
Vertical Length : 4

Horizontal Length : 5



Now use Pythagoras to calculate the distance between the two plotted points. Find the short side lengths first. Answer to 1 decimal place.

7



(3, 5) & (-1, -3).

Vertical Length : 8

Horizontal Length : 4

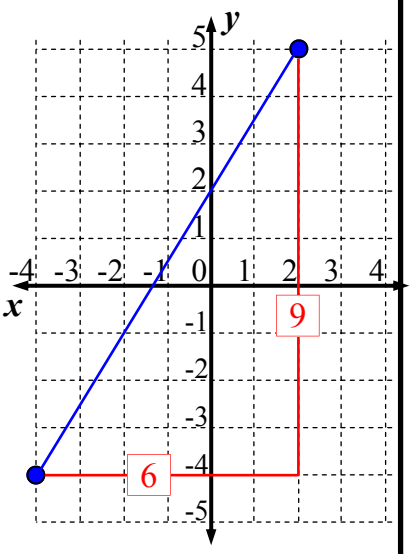
$d^2 = 8^2 + 4^2$

$d^2 = 80$

$d = \sqrt{80}$

$d = 8.9$ units

8 (-4, -4) & (2, 5).



Vertical Length : 9

Horizontal Length : 6

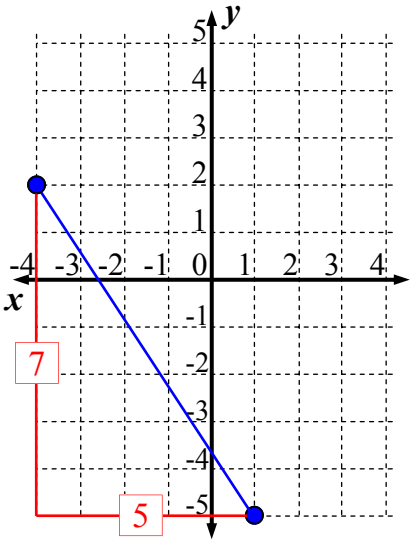
$d^2 = 6^2 + 9^2$

$d^2 = 117$

$d = \sqrt{117}$

$d = 10.8$ units

9



(-4, 2) & (1, -5).

Vertical Length : 7

Horizontal Length : 5

$d^2 = 7^2 + 5^2$

$d^2 = 74$

$d = \sqrt{74}$

$d = 8.6$ units

Cartesian Plane - Distance - All Quadrants (Sheet 2)

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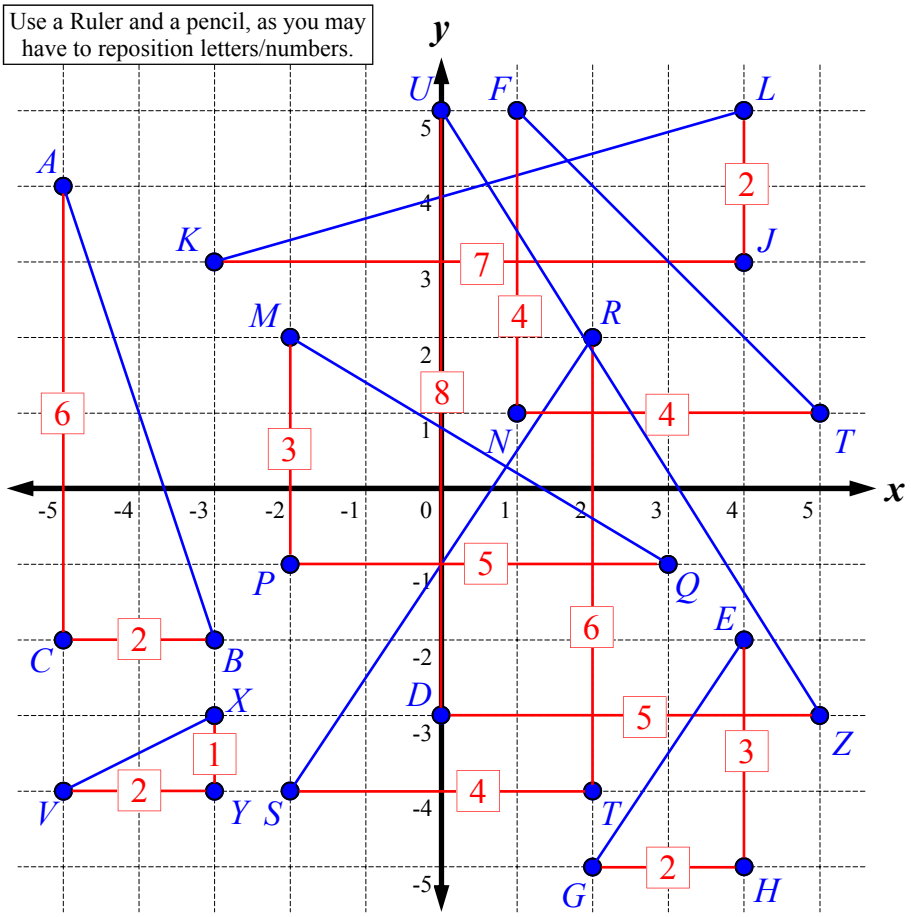
Plot the two points on the graph and draw a line between them, this is the hypotenuse. Draw the two short sides then apply Pythagoras to find the distance between the two points (to 1 d.p.). Note that '*u*' stands for units.

Use a Ruler and a pencil, as you may have to reposition letters/numbers.



1 *K* (-3, 3) and *L* (4, 5). Label right angle *J* at (4, 3).

JK = 7 *u* *JL* = 2 *u*

$KL^2 = 7^2 + 2^2$

$KL^2 = 53$

Rewrite

$KL = \sqrt{53}$

$KL = 7.3$ *units*

2 *A* (-5, 4) & *B* (-3, -2). Label right angle *C* at (-5, -2).

AC = 6 *u* *BC* = 2 *u*

$AB^2 = 6^2 + 2^2$

$AB^2 = 40$

Rewrite

$AB = \sqrt{40}$

$AB = 6.3$ *units*

3 *S* (-2, -4) and *R* (2, 2). Label right angle *T* at (2, -4).

TR = 6 *u* *TS* = 4 *u*

$SR^2 = 6^2 + 4^2$

$SR^2 = 52$

$SR = \sqrt{52}$

$SR = 7.2$ units

4 *V* (-5, -4) & *X* (-3, -3). Label right angle *Y* at (-3, -4).

VY = 2 *u* *XY* = 1 *u*

$VX^2 = 2^2 + 1^2$

$VX^2 = 5$

$VX = \sqrt{5}$

$VX = 2.2$ units

5 *F* (1, 5) & *T* (5, 1). Label right angle *N*.

FN = 4 *units* *TN* = 4 *units*

$FT^2 = 4^2 + 4^2$

$FT^2 = 32$

$FT = \sqrt{32}$

$FT = 5.7$ *units*

6 *U* (0, 5) & *Z* (5, -3). Label right angle *D*.

UD = 8 *units* *ZD* = 5 *units*

$UZ^2 = 8^2 + 5^2$

$UZ^2 = 89$

$UZ = \sqrt{89}$

$UZ = 9.4$ *units*

7 *E* (4, -2) & *G* (2, -5). Label right angle *H*.

EH = 3 *units* *GH* = 2 *units*

$EG^2 = 3^2 + 2^2$

$EG^2 = 13$

$EG = \sqrt{13}$

$EG = 3.6$ *units*

8 *M* (-2, 2) & *Q* (3, -1). Label right angle *P*.

MP = 3 *units* *QP* = 5 *units*

$MQ^2 = 3^2 + 5^2$

$MQ^2 = 34$

$MQ = \sqrt{34}$

$MQ = 5.8$ *units*

Cartesian Plane - Distance - All Quadrants (Homework Strip)

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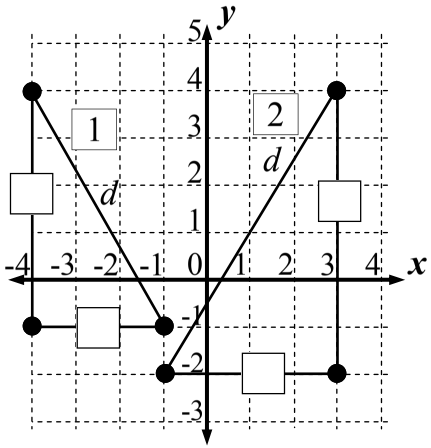
Date Due: _____

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

2 $d^2 = \square^2 + \square^2$

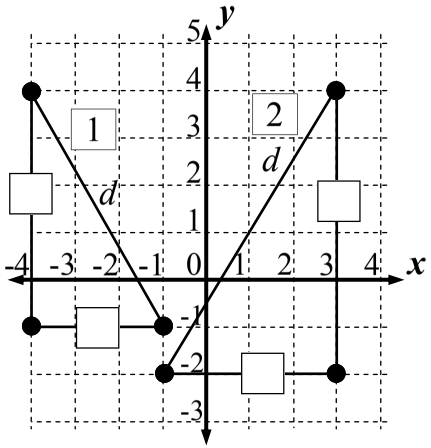
$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

Date Due: _____

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

2 $d^2 = \square^2 + \square^2$

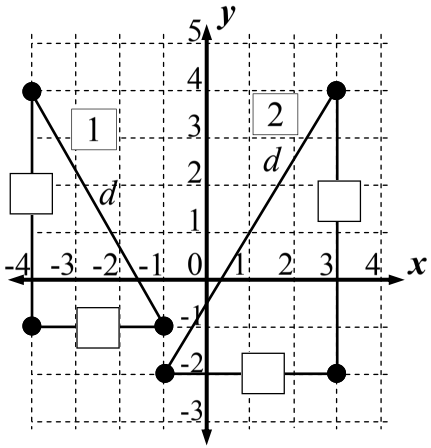
$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

Date Due: _____

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

2 $d^2 = \square^2 + \square^2$

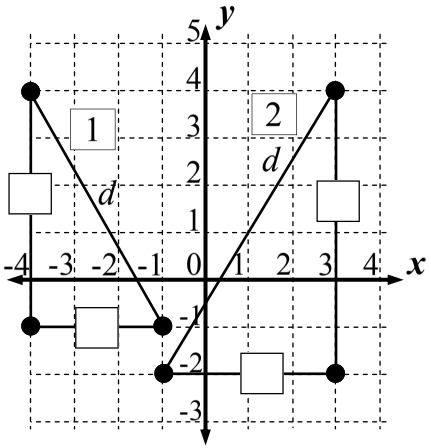
$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

Date Due: _____

Calculate the distance between the two points. Answer to 1 decimal place



1 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

2 $d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square$ *units*

Cartesian Plane - Distance - All Quadrants (Homework Strip)

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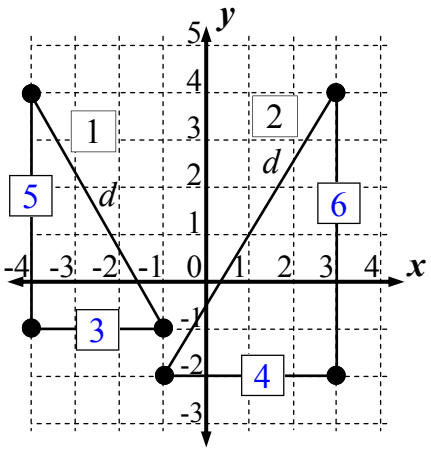
Date Due:

Calculate the distance between the two points. Answer to 1 decimal place



1

$d^2 = 3^2 + 5^2$

$d^2 = 34$

$d = \sqrt{34}$

$d = 5.8$ *units*

2

$d^2 = 4^2 + 6^2$

$d^2 = 52$

$d = \sqrt{52}$

$d = 7.2$ *units*

Cartesian Plane - Find A Word

Look for words in the list at the bottom of the grid. Once you find a word cross it off the list.

A letter could be used more than once so don’t colour it in too dark (using a texta for example) so that you can still read it.

Cartesian Plane - Find A Word

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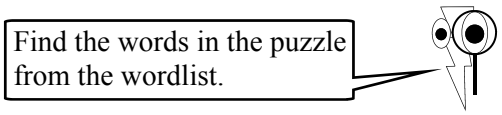

E	H	E	Q	U	A	T	I	O	N	A	X	S	X	A
V	A	T	Q	P	V	W	T	N	I	O	P	D	I	M
I	L	A	Q	L	E	P	Q	E	U	N	A	F	N	X
T	F	N	Q	O	R	E	L	G	N	A	I	R	T	A
I	D	I	I	T	T	U	Q	A	Q	I	N	A	E	M
S	I	D	N	T	I	N	N	V	N	S	A	X	R	A
O	S	R	T	I	C	Q	A	E	A	E	E	X	V	X
P	T	O	E	N	A	X	S	R	O	T	P	X	A	E
X	A	O	R	G	L	E	O	A	D	R	A	O	L	X
A	N	C	C	C	X	G	P	G	X	A	I	J	L	A
X	C	A	E	A	A	O	H	E	E	C	U	G	R	S
E	E	X	P	H	I	N	W	O	D	S	L	Q	I	O
X	L	A	T	N	O	Z	I	R	O	H	I	I	H	N
A	X	Y	T	G	R	A	D	I	E	N	T	R	N	H
E	P	N	E	G	A	T	I	V	E	H	O	R	I	E

WORDLIST

GRADIENT	POINT*	MIDPOINT*	RISE	VERTICAL
POSITIVE	INTERVAL	INTERCEPT	SLOPE	MEAN
HALF	TRIANGLE	PLOTTING	QUADRANT	CARTESIAN
AXES	RUN	NEGATIVE	LINE	UP
DISTANCE	AVERAGE	ACROSS	DOWN	EQUATION
PLANE	HORIZONTAL	PYTHAGORAS	COORDINATE	ORIGIN

*MIDPOINT AND POINT ARE SEPARATE WORDS

Cartesian Plane - Find A Word

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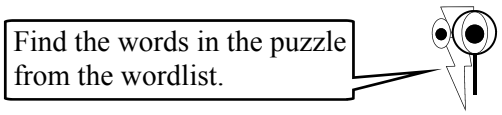

E	H	E	Q	U	A	T	I	O	N	A	X	S	X	A
V	A	T	Q	P	V	W	T	N	I	O	P	D	I	M
I	L	A	Q	L	E	P	Q	E	U	N	A	F	N	X
T	F	N	Q	O	R	E	L	G	N	A	I	R	T	A
I	D	I	I	T	T	U	Q	A	Q	I	N	A	E	M
S	I	D	N	T	I	N	N	V	N	S	A	X	R	A
O	S	R	T	I	C	Q	A	E	A	E	E	X	V	X
P	T	O	E	N	A	X	S	R	O	T	P	X	A	E
X	A	O	R	G	L	E	O	A	D	R	A	O	L	X
A	N	C	C	C	X	G	P	G	X	A	I	J	L	A
X	C	A	E	A	A	O	H	E	E	C	U	G	R	S
E	E	X	P	H	I	N	W	O	D	S	L	Q	I	O
X	L	A	T	N	O	Z	I	R	O	H	I	I	H	N
A	X	Y	T	G	R	A	D	I	E	N	T	R	N	H
E	P	N	E	G	A	T	I	V	E	H	O	R	I	E

WORDLIST

~~GRADIENT~~	~~POINT*~~	~~MIDPOINT*~~	~~RISE~~	~~VERTICAL~~
~~POSITIVE~~	~~INTERVAL~~	~~INTERCEPT~~	~~SLOPE~~	~~MEAN~~
~~HALF~~	~~TRIANGLE~~	~~PLOTTING~~	~~QUADRANT~~	~~CARTESIAN~~
~~AXES~~	~~RUN~~	~~NEGATIVE~~	~~LINE~~	~~UP~~
~~DISTANCE~~	~~AVERAGE~~	~~ACROSS~~	~~DOWN~~	~~EQUATION~~
~~PLANE~~	~~HORIZONTAL~~	~~PYTHAGORAS~~	~~COORDINATE~~	~~ORIGIN~~

*MIDPOINT AND POINT ARE SEPARATE WORDS

Cartesian Plane Review

This is the review of the Cartesian Plane Topic.

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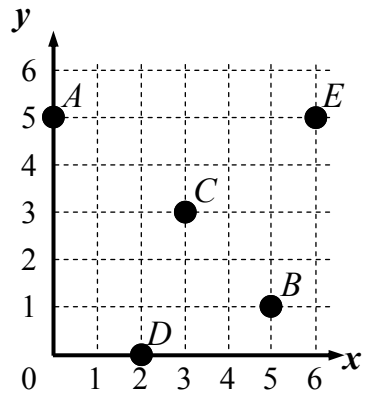
Give the coordinates for the five plotted points.



1 *A* _____

2 *B* _____

3 *C* _____

4 *D* _____

5 *E* _____

Give the coordinates for the six plotted points.

6 *A* _____

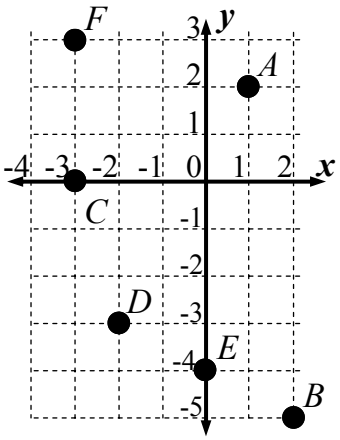
7 *B* _____

8 *C* _____

9 *D* _____

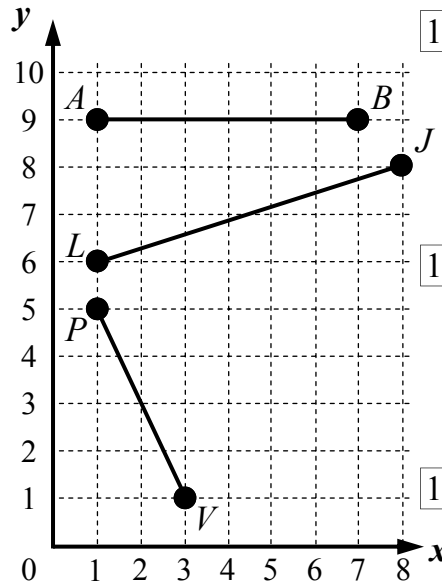
10 *E* _____

11 *F* _____



12 Give the coordinates for the origin _____

Plot the midpoint '*M*' on the intervals, give the coordinates



13 *AB* _____ Midpoint Coordinates

14 *LJ* _____ Midpoint Coordinates

15 *PV* _____ Midpoint Coordinates

Plot the points, find the midpoint coordinates.

16 *A* (-4, -5)
B (-2, 3)

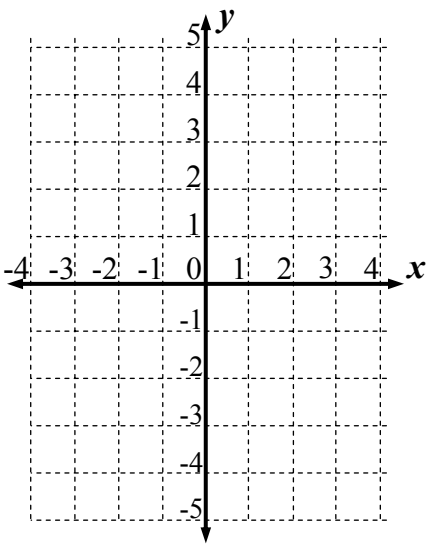
_____ Midpoint of *AB*

17 *F* (-3, 5)
Z (4, 3)

_____ Midpoint of *FZ*

18 *T* (3, -1)
Q (-3, -5)

_____ Midpoint of *TQ*



Calculate the coordinates of the midpoint for these intervals, use:

$$M(\overline{x}, \overline{y}) = \left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2} \right)$$

19 (4, 6) and (10, 12)

_____ _____

_____ _____

_____

20 (-5, -2) and (9, 8)

_____ _____

_____ _____

_____

21 (-9, -8) and (-2, -2)

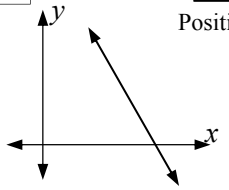
_____ _____

_____ _____

_____

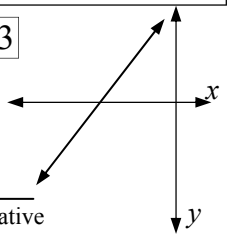
Do these lines have a positive or negative gradient?

22



_____ Positive or negative

23



_____ Positive or negative

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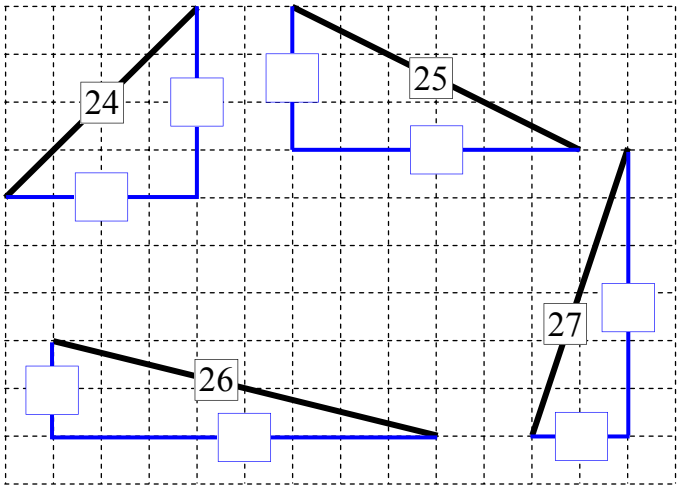
Record the triangle side lengths and calculate the gradient for the following intervals. Simplify when possible.

Use: $m = \frac{rise}{run}$



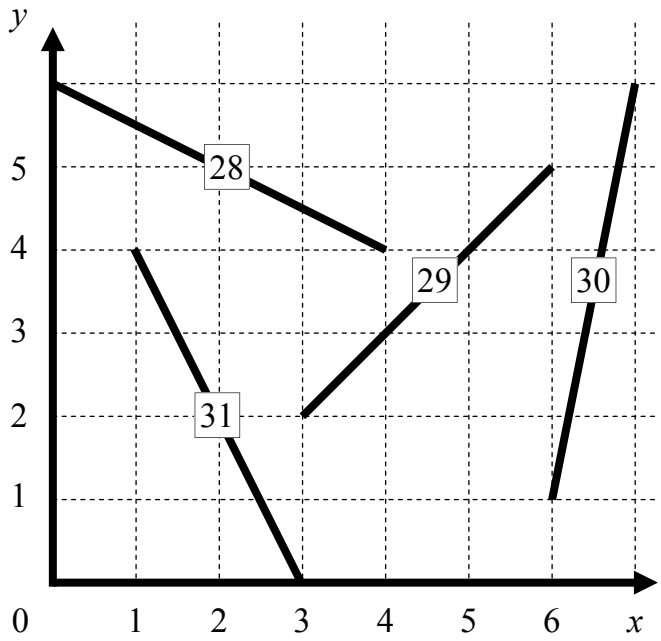
24 $m =$ _____ 25 _____

26 _____ 27 _____

Calculate the gradient for the following intervals.

Use: $m = \frac{rise}{run}$

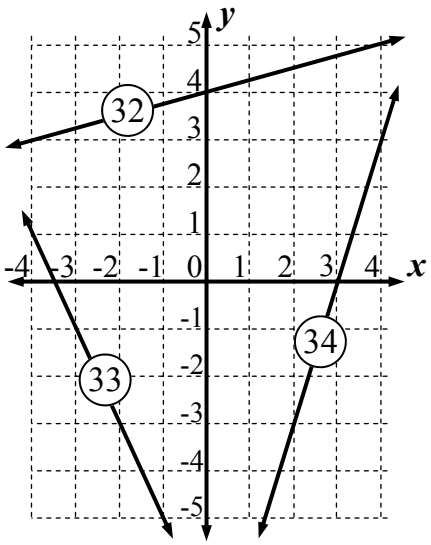
Simplify your answer where possible.



28 _____ 29 _____

30 _____ 31 _____

Calculate the gradient for the following lines. Simplify your answer where possible.



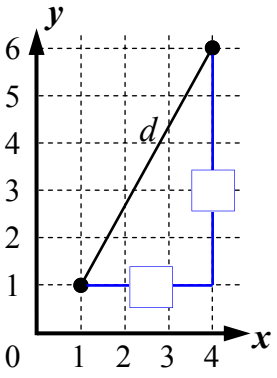
32 _____ 33 _____

34 _____

Calculate the distance between these two points. Use Pythagoras Theorem rounding to 1 d.p.

Use: $c^2 = a^2 + b^2$

35



_____

_____

_____

_____

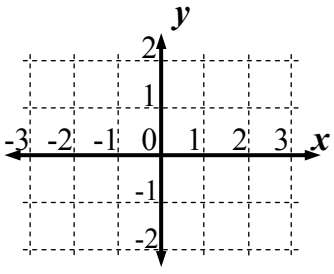
36 (-3, 2) and (3, -2).

_____

_____

_____

_____



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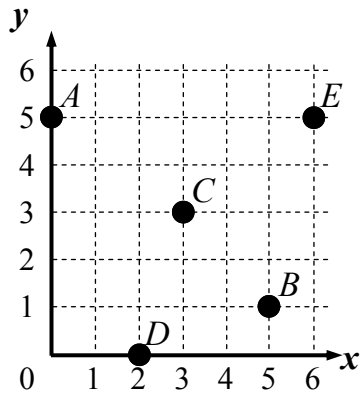
Give the coordinates for the five plotted points.



1 A (0, 5)

2 B (5, 1)

3 C (3, 3)

4 D (2, 0)

5 E (6, 5)

Give the coordinates for the six plotted points.

6 A (1, 2)

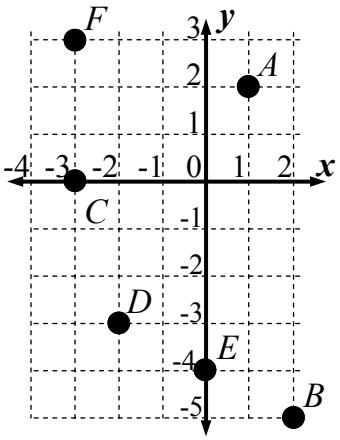
7 B (2, -5)

8 C (-3, -1)

9 D (-2, -3)

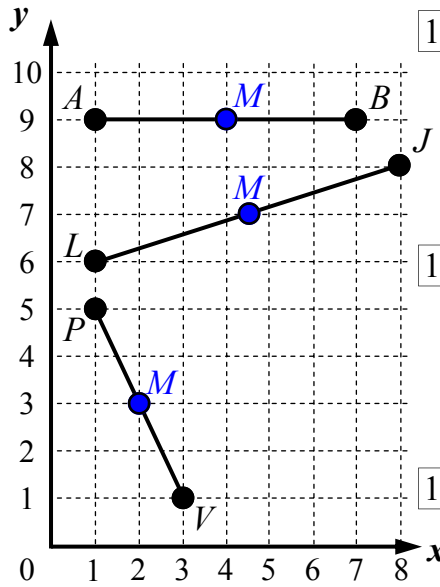
10 E (0, -4)

11 F (-3, 3)



12 Give the coordinates for the origin (0, 0)

Plot the midpoint 'M' on the intervals, give the coordinates



13 AB (4, 9) Midpoint Coordinates

14 LJ (4½, 7) Midpoint Coordinates

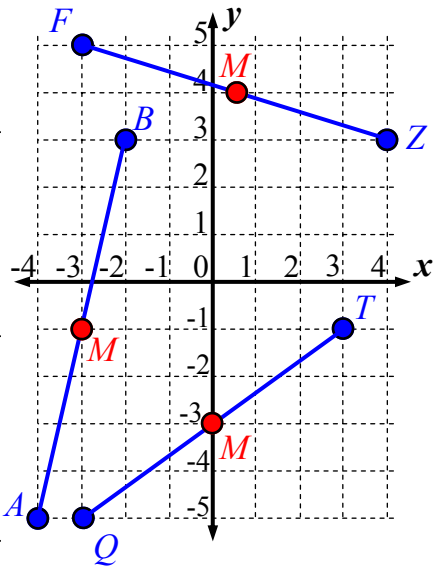
15 PV (2, 3) Midpoint Coordinates

Plot the points, find the midpoint coordinates.

16 A (-4, -5)
B (-2, 3)
(-3, -1)
Midpoint of AB

17 F (-3, 5)
Z (4, 3)
(½, 4)
Midpoint of FZ

18 T (3, -1)
Q (-3, -5)
(0, -3)
Midpoint of TQ



Calculate the coordinates of the midpoint for these intervals, use:

$$M(\bar{x}, \bar{y}) = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

19 (4, 6) and (10, 12)

$x_1\ y_1 \quad x_2\ y_2$

$\bar{x} = \frac{4 + 10}{2} = 7$ $\bar{y} = \frac{6 + 12}{2} = 9$

$M(\bar{x}, \bar{y}) = (7, 9)$

20 (-5, -2) and (9, 8)

$x_1\ y_1 \quad x_2\ y_2$

$\bar{x} = \frac{(-5) + 9}{2} = 2$ $\bar{y} = \frac{(-2) + 8}{2} = 3$

$M(\bar{x}, \bar{y}) = (2, 3)$

21 (-9, -8) and (-2, -2)

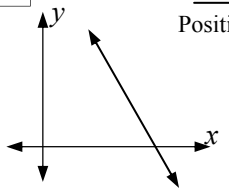
$x_1\ y_1 \quad x_2\ y_2$

$\bar{x} = \frac{(-9) + (-2)}{2} = -5\frac{1}{2}$ $\bar{y} = \frac{(-2) + (-8)}{2} = -5$

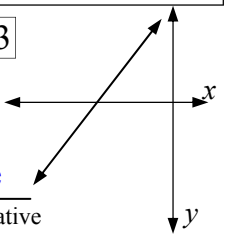
$M(\bar{x}, \bar{y}) = (-5\frac{1}{2}, -5)$

Do these lines have a positive or negative gradient?

22 Negative (Positive or negative)



23 Positive (Positive or negative)



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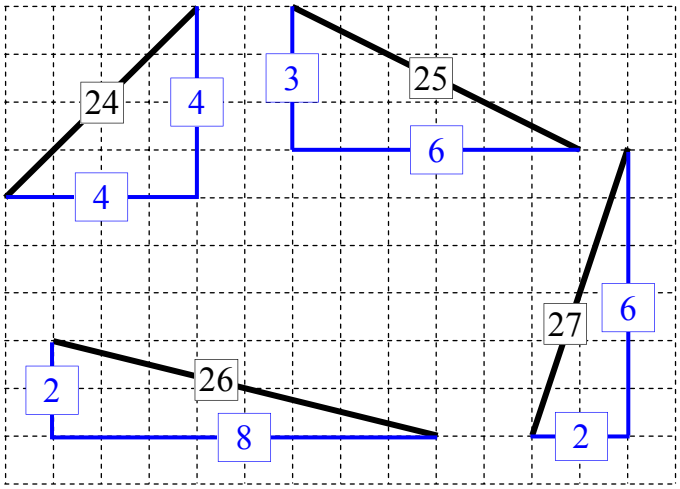
Record the triangle side lengths and calculate the gradient for the following intervals. Simplify when possible.

Use: $m = \frac{rise}{run}$



24 $m = \frac{4}{4} = 1$

25 $m = \frac{3}{6} = \frac{-1}{2}$

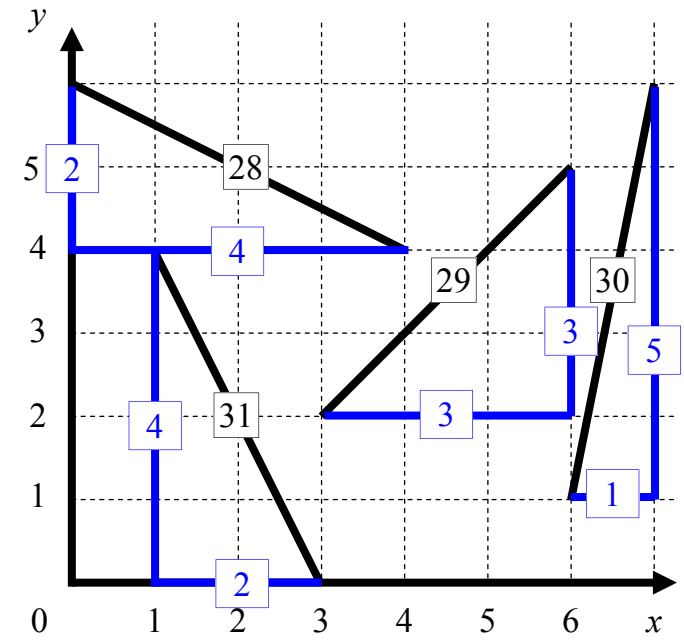
26 $m = \frac{2}{8} = \frac{-1}{4}$

27 $m = \frac{6}{2} = 3$

Calculate the gradient for the following intervals.

Use: $m = \frac{rise}{run}$

Simplify your answer where possible.



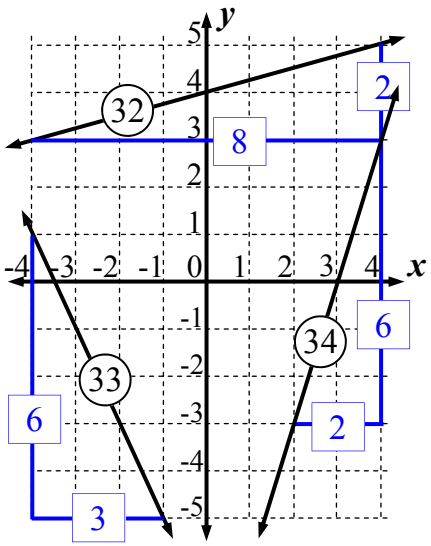
28 $m = \frac{2}{4} = \frac{-1}{2}$

29 $m = \frac{3}{3} = 1$

30 $m = \frac{5}{1} = 5$

31 $m = \frac{4}{2} = -2$

Calculate the gradient for the following lines. Simplify your answer where possible.



32 $m = \frac{2}{8} = \frac{1}{4}$

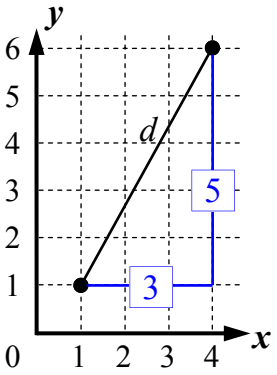
33 $m = \frac{6}{3} = -2$

34 $m = \frac{6}{2} = 3$

Calculate the distance between these two points. Use Pythagoras Theorem rounding to 1 d.p.

Use: $c^2 = a^2 + b^2$

35



$d^2 = 3^2 + 5^2$

$d^2 = 34$

$d = \sqrt{34}$

$d = 5.8$ units

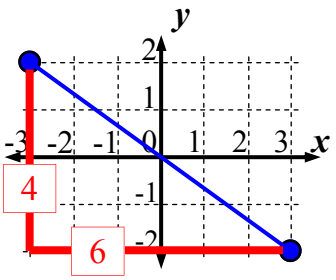
36 (-3, 2) and (3, -2).

$d^2 = 4^2 + 6^2$

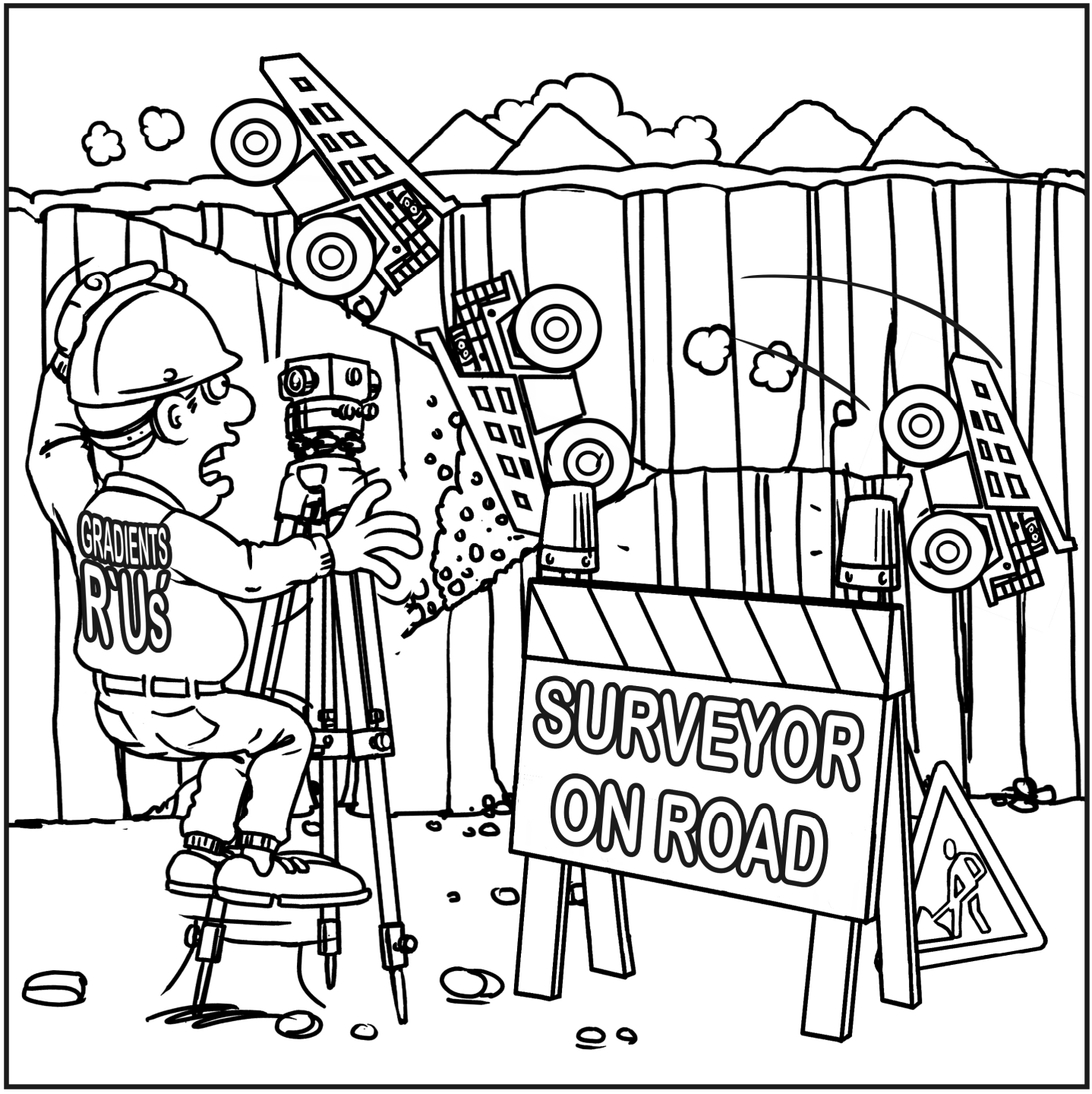
$d^2 = 52$

$d = \sqrt{52}$

$d = 7.2$ units



The Cartesian Plane



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Cartesian Plane - Plotting Points - Positive Quadrant (Sheet 1)

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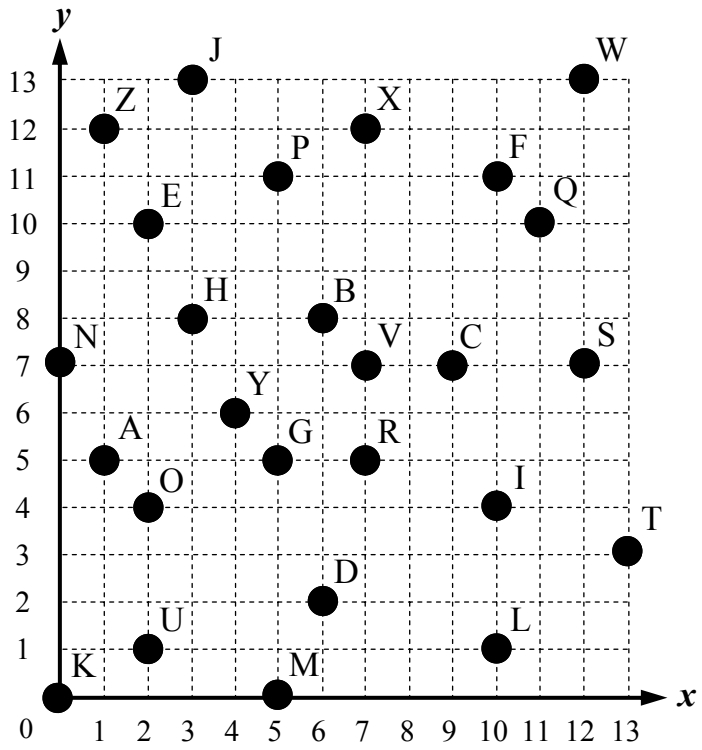
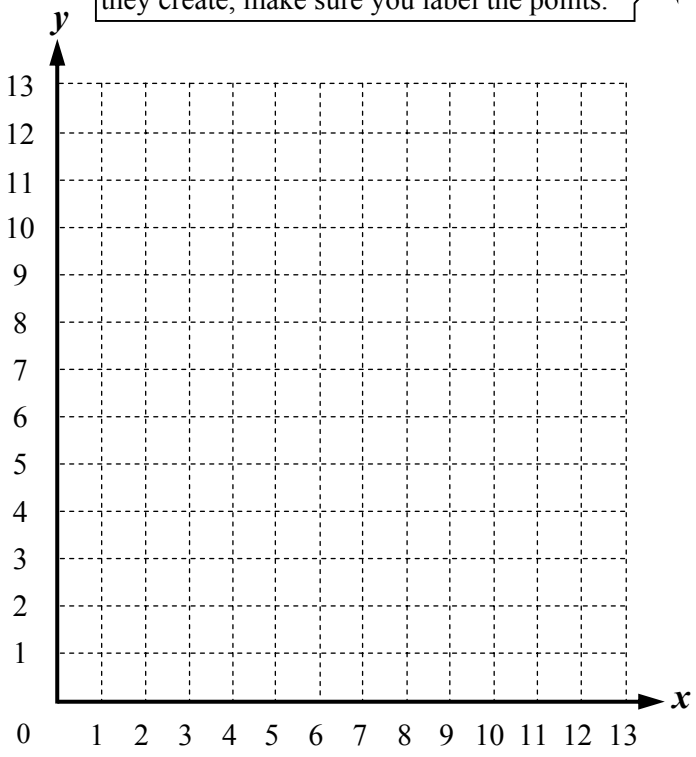
Give the co-ordinates for the following points, place them in brackets separated by a comma



1	Point A (,)	14	Point N
2	Point B (,)	15	Point O
3	Point C	16	Point P
4	Point D	17	Point Q
5	Point E	18	Point R
6	Point F	19	Point S
7	Point G	20	Point T
8	Point H	21	Point U
9	Point I	22	Point V
10	Point J	23	Point W
11	Point K	24	Point X
12	Point L	25	Point Y
13	Point M	26	Point Z

Place the groups of points given below on the grid, join the points and name the shape they create, make sure you label the points.



27 Point A (10, 4) Point B (11, 2)
Point C (12, 4) Point D (11, 5)
Shape formed: _____

28 Point E (3, 5) Point F (0, 8)
Point G (5, 13) Point H (8, 10)
Shape formed: _____

29 Point J (5, 4) Point K (9, 6)
Point L (7, 8)
Shape formed: _____
Two word description

30 Point M (2, 3) Point N (8, 3)
Point O (6, 0) Point P (0, 0)
Shape formed: _____

31 Point R (10, 9) Point S (13, 13)
Point T (13, 9)
Shape formed: _____
Two or three word description

Cartesian Plane - Drawing Animals - Positive Quadrant (Sheet 2)

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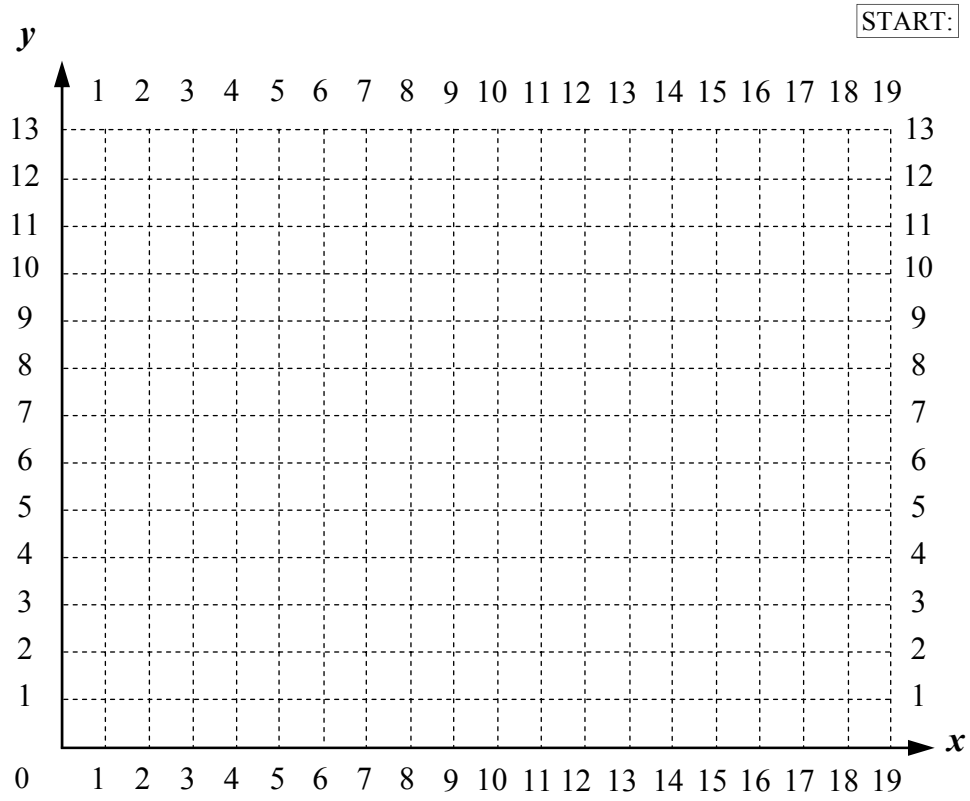
Join the points on the grid with the following co-ordinates and you will find an animal friend who has only one hand.

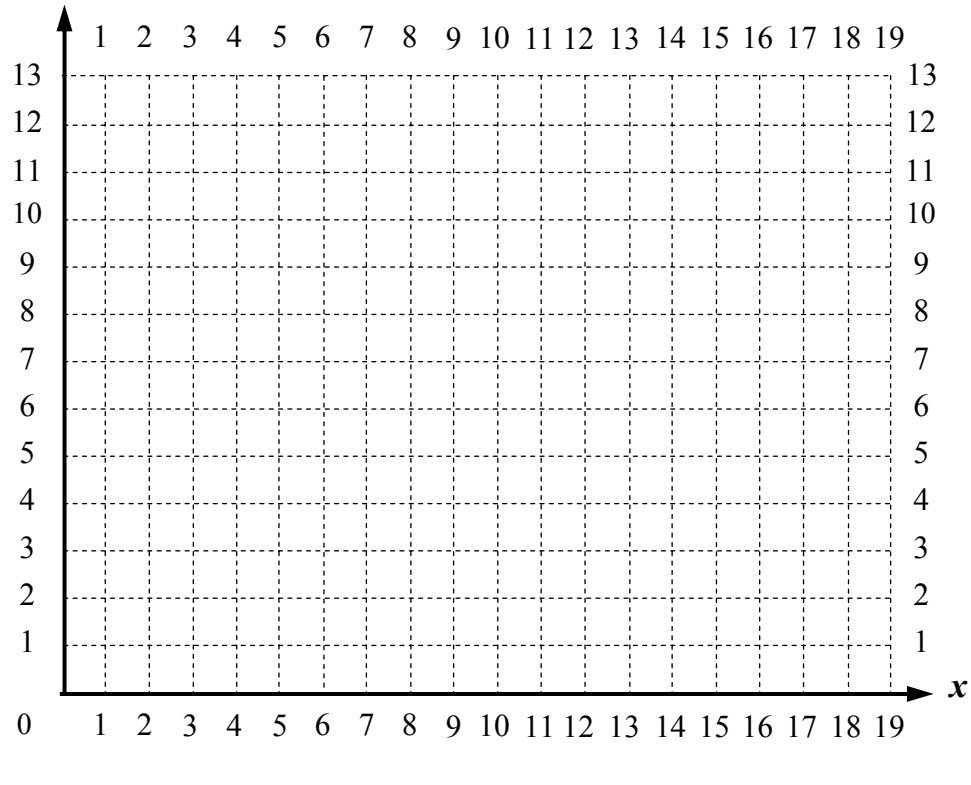


Co-ordinates:

START: (2, 12) , (3, 12) , (4, 11) , (5, 12) ,
(7, 12) , (8, 11) , (9, 12) , (10, 12) ,
(11, 11) , (11, 6) , (10, 3) , (9, 3) ,
(8, 7) , (8, 5) , (7, 7) , (7, 3) ,
(6, 2) , (4, 2) , (4, 3) , (5, 3) ,
(6, 4) , (5, 7) , (4, 5) , (4, 7) ,
(3, 3) , (2, 3) , (1, 6) , (1, 11) ,
(2, 12) STOP!

START:
(11, 10) , (12, 11) , (16, 12) , (18, 10) ,
(19, 7) , (18, 9) , (18, 3) , (15, 3) ,
(16, 4) , (16, 6) , (14, 5) , (11, 5) ,
(11, 4) , (13, 4) , (13, 1) , (12, 2) ,
(9, 2) , (8, 3) , (7, 6) , STOP!

Join the points and this time you will find a friend with which you will have to be very patient.



Co-ordinates:

START: (1, 11) , (2, 10) , (2, 9) , (1, 8) ,
(1, 7) , (2, 6) , (2, 5) , (3, 3) ,
(5, 1) , (7, 0) , (13, 0) , (16, 3) ,
(17, 5) , (15, 3) , (12, 2) , (8, 2) ,
(6, 3) , (4, 5) , (3, 6) , (4, 7) ,
(4, 8) , (3, 9) , (3, 10) , (4, 11) ,
STOP!

START:
(11, 6) , (12, 6) , (11, 7) , (10, 6) ,
(11, 5) , (12, 5) , (14, 6) , (14, 7) ,
(12, 9) , (10, 9) , (8, 7) , (8, 5) ,
(10, 3) , (12, 3) , (14, 4) , (15, 6) ,
(15, 7) , (14, 9) , (13, 10) , (10, 10) ,
(8, 9) , (7, 7) , (8, 3) , (11, 2) ,
(12, 2) , (15, 3) , (17, 6) , (17, 7) ,
(15, 11) , (12, 12) , (10, 12) , (7, 11) ,
(5, 9) , (4, 6) , (4, 5) , STOP!

Cartesian Plane - Midpoint (Graphical) - Positive Quadrant (Sheet 1)

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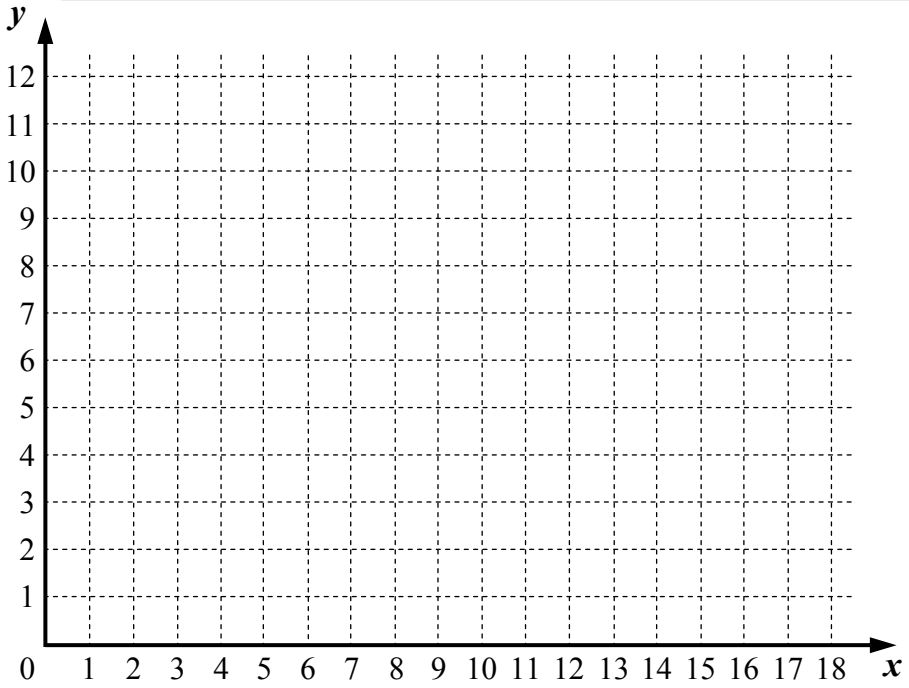
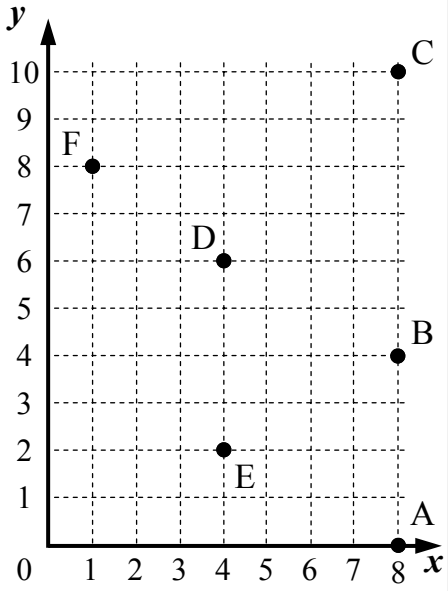
Plot the points and use a ruler to rule a line between the two points and find the midpoint. Plot the midpoint on the line record its co-ordinates. Write letters in pencil, as you may need to move them later!



This time the points are plotted, rule the line, find the midpoint and record all coordinates.



13 Construct DC and find 'M'

D: (☐ , ☐) C: (☐ , ☐)

Midpoint M: (☐ , ☐)

14 Construct FE and find 'M'

F: (☐ , ☐) E: (☐ , ☐)

Midpoint M: (☐ , ☐)

15 Construct FC and find 'M'

F: (☐ , ☐) C: (☐ , ☐)

Midpoint M: (☐ , ☐)

16 Construct BD and find 'M'

B: (☐ , ☐) D: (☐ , ☐)

Midpoint M: (☐ , ☐)

17 Construct AD and find 'M'

A: (☐ , ☐) D: (☐ , ☐)

Midpoint M: (☐ , ☐)

Steps: Plot the points on the number plane.
Rule a line in between the two points.
Plot the midpoint, call it 'M'.
Write the co-ordinate for the midpoint.

1 A (1, 12) and B (3, 4).

Midpoint: (☐ , ☐)

Label the midpoint 'M' on the number plane

2 Y (18, 10) and X (6, 12).

Midpoint: (☐ , ☐)

3 L (6, 11) and N (6, 1).

Midpoint: _____

4 E (0, 4) and F (6, 0).

Midpoint: _____

5 Q (15, 9) and R (5, 3).

Midpoint: _____

'QR' will cross previous line

6 J (9, 7) and K (17, 7).

Midpoint: _____

It is possible to have '½' in a co-ordinate. These all do! Approach these the same way.

Use a different colour for these lines

7 T (18, 4) and B (3, 4).

Midpoint: _____

8 C (10, 0) and D (16, 3).

Midpoint: _____

9 L (6, 11) and J (9, 7).

Midpoint: _____

10 T (18, 4) and K (17, 7).

Midpoint: _____

11 B (3, 4) and L (6, 11).

Midpoint: _____

12 V (10, 10) and Q (15, 9).

Midpoint: _____

Cartesian Plane - Midpoint (Analytical) - Positive Quadrant (Sheet 2)

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Find the average of these two numbers. Add them, press '=' and then divide '÷' by 2. $\bar{x}$ is the mean (pronounced *x*-bar).

1 22 and 38

$$\bar{x} = \frac{\square + \square}{2} = \square$$

Calc: 2 2 + 3 8 = ÷ 2 =

2 26 and 6

$$\bar{x} = \frac{\square + \square}{2} = \square$$

3 5 and 33

$$\bar{x} =$$

4 14 and 21

$$\bar{x} =$$

With halves use '½' not '.5'

Find the midpoint of the interval that joins these two points. Find two averages.

Example

Find the midpoint of the interval joining (2, 7) and (14, 15).

x_1 y_1 x_2 y_2

$$\bar{x} = \frac{2 + 14}{2} = 8$$

$$\bar{y} = \frac{7 + 15}{2} = 11$$

$$M(\bar{x}, \bar{y}) = (8, 11)$$

5 (5, 2) and (23, 14).

$$\bar{x} = \frac{\square + \square}{2} = \square$$

$$\bar{y} = \frac{\square + \square}{2} = \square$$

$$M(\bar{x}, \bar{y}) = (\square, \square)$$

6 (1, 14) and (19, 22).

$$\bar{x} = \frac{\square + \square}{2} = \square$$

$$\bar{y} = \frac{\square + \square}{2} = \square$$

$$M(\bar{x}, \bar{y}) = (\square, \square)$$

7 (14, 2) and (8, 6).

$$\bar{x} =$$

$$\bar{y} =$$

$$M(\bar{x}, \bar{y}) = (\square, \square)$$

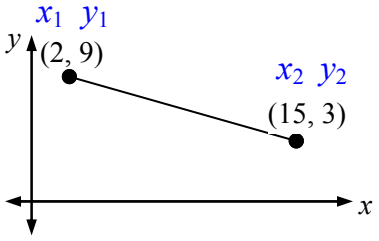
8 (9, 17) and (3, 8).

9 (11, 2) and (12, 9).

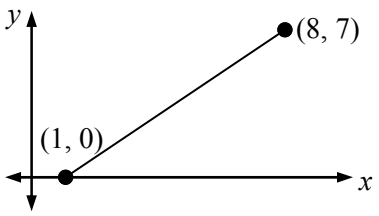
10 (6, 0) and (11, 13).

Use the same method, but this time you have to get your information from a sketch.

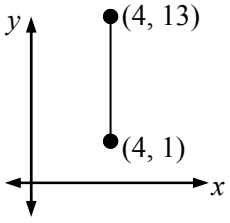
11



12



13



Cartesian Plane - Plotting Points - All Quadrants (Sheet 1)

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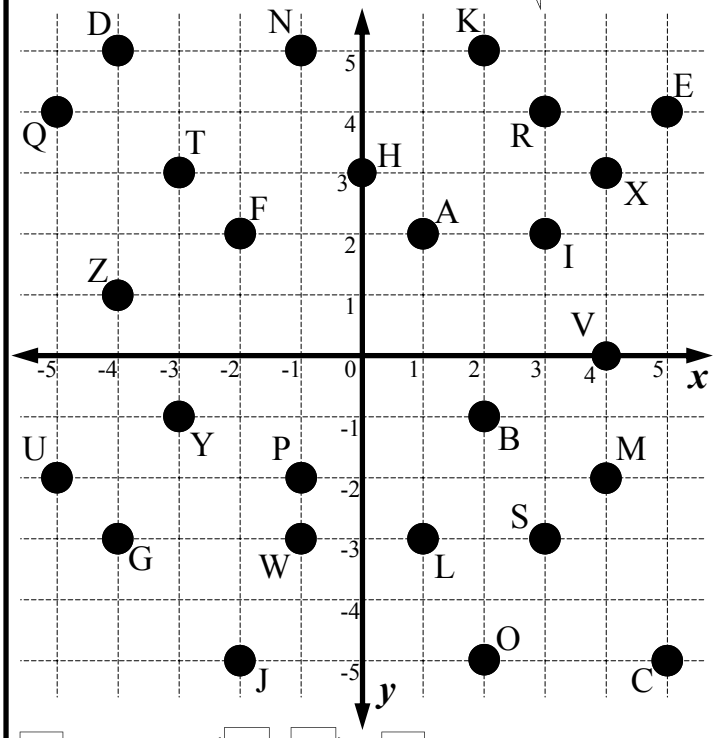
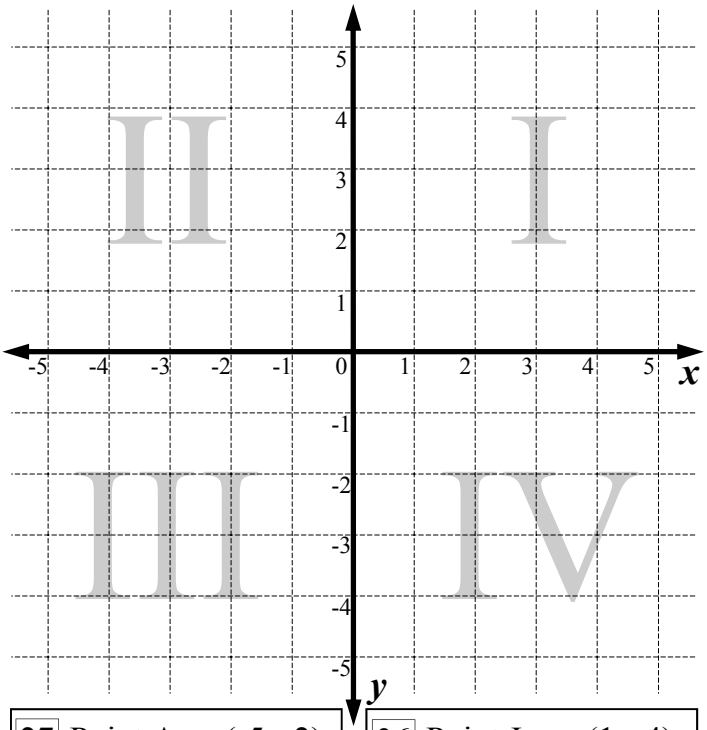
Give the co-ordinates for the points on the number plane below.



1 Point A (,)
2 Point B
3 Point C
4 Point D
5 Point E
6 Point F
7 Point G
8 Point H
9 Point I
10 Point J
11 Point K
12 Point L
13 Point M
14 Point N
15 Point O
16 Point P
17 Point Q
18 Point R
19 Point S
20 Point T
21 Point U
22 Point V
23 Point W
24 Point X
25 Point Y
26 Point Z

Plot the following points on the number plane below, label each point and give the quadrant that the point lies in.



27 Point A (-5, -2) Quadrant I II III IV Axis
28 Point B (2, 4) Quadrant I II III IV Axis
29 Point C (4, 0) Quadrant I II III IV Axis
30 Point D (3, -3) Quadrant I II III IV Axis
31 Point E (-3, 5) Quadrant I II III IV Axis
32 Point F (0, 0) Quadrant I II III IV Axis
33 Point G (5, -5) Quadrant I II III IV Axis
34 Point H (-2, 4) Quadrant I II III IV Axis
35 Point I (1, 2) Quadrant I II III IV Axis
36 Point J (1, -4) Quadrant I II III IV Axis
37 Point K (-3, -4) Quadrant I II III IV Axis
38 Point L (-1, 0) Quadrant I II III IV Axis
39 Point M (-4, 2) Quadrant I II III IV Axis
40 Point N (3, -5) Quadrant I II III IV Axis
41 Point O (0, -3) Quadrant I II III IV Axis
42 Point P (-5, -5) Quadrant I II III IV Axis
43 Point R (-2, 1) Quadrant I II III IV Axis
44 Point S (2, -2) Quadrant I II III IV Axis

Cartesian Plane - Drawing Animals - All Quadrants (Sheet 2)

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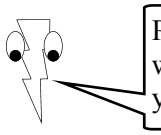
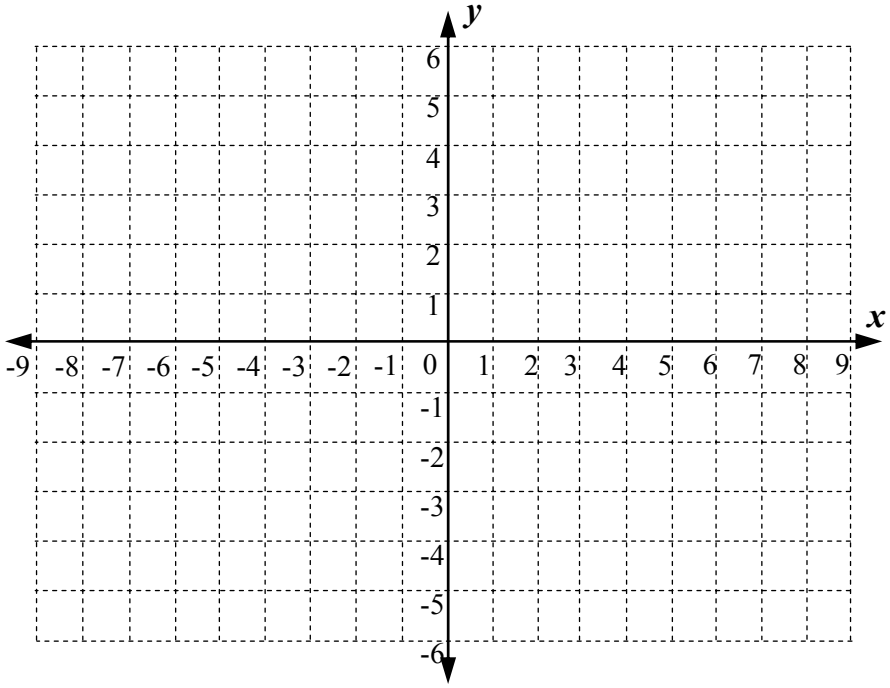


Plot the points and join them with lines to meet one of your more colourful friends

Co-ordinates: START: (-1, 3) , (-1, 4) , (1, 6) , (2, 6) , (6, 5) , (7, 4) , (7, 2) , (6, -1) , (3, -2) , (5,-4) , (5, -5) , (3, -6) , (1, -6) , (-2, -4) , (-4, -6) , (-5, -6) , (-6, -5) , (-6, -4) , (-5, -2) , (-6, -1) , (-8, 2) , (-8, 4) , (-7, 6) , (-6, 6) , (-4, 4) , (-4, 3) , STOP!

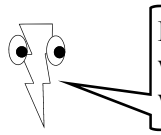


START: (-2, 1) , (1, 4) , (4, 4) , (5, 2) , (3,-1) , (0, -2) , (3, -3) , (3, -5) , (1, -5) , (-1, -4) , (-2, -3) , (-4, -5) , (-5, -5) , (-5, -3) , (-3, -2) , (-5, -1) , (-7, 2) , (-6, 4) , (-5, 4) , (-3,1) , STOP!

START: (-4, 3) , (-3, 4) , (-2, 4) , (-1, 3) , (-2, 2) , (-2, -4) , (-3, 2) , (-4, 3) , STOP!

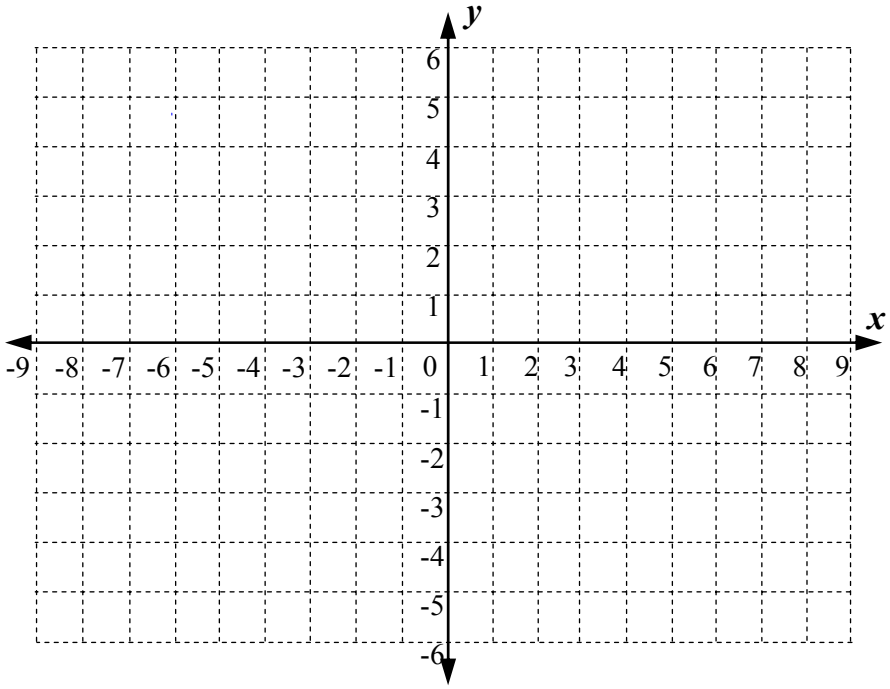
START: (-3, 4) , (-4, 6) , STOP!

START: (-2, 4) , (-1, 6) , STOP!



Plot the points and join them with lines to share your lunch with your vegetarian friend.

Co-ordinates: START: (2, -1) , (3, -3) , (3, -4) , (2, -5) , (0, -6) , (-1, -6) , (-3, -5) , (-4, -4) , (-4, -3) , (-3, -1) , (-6, 2) , (-7, -4) , (-8, 4) , (-7, 6) , (-4, 5) , (-2, -1) , (0, -1) , (3, 4) , (5, 6) , (8, 6) , (9, 4) , (5, 6) , STOP!



START: (7, 5) , (6, 3) , (2, -1) , STOP!

START: (2, 0) , (4, 4) , (6, 5) , (5, 3) , (2, 0) , STOP!

START: (-3, 0) , (-5, 2) , (-6, 4) , (-4, 3) , (-3, 0) , STOP!

START: (-2, -4) , (-6, -4) , STOP!

START: (-2, -4) , (-5, -2) , STOP!

START: (-2, -4) , (-5, -3) , STOP!

START: (1, -4) , (5, -4) , STOP!

START: (1, -4) , (5, -3) , STOP!

START: (1, -4) , (5, -5) , STOP!

Cartesian Plane - Midpoint (Graphical) - All Quadrants (Sheet 1)

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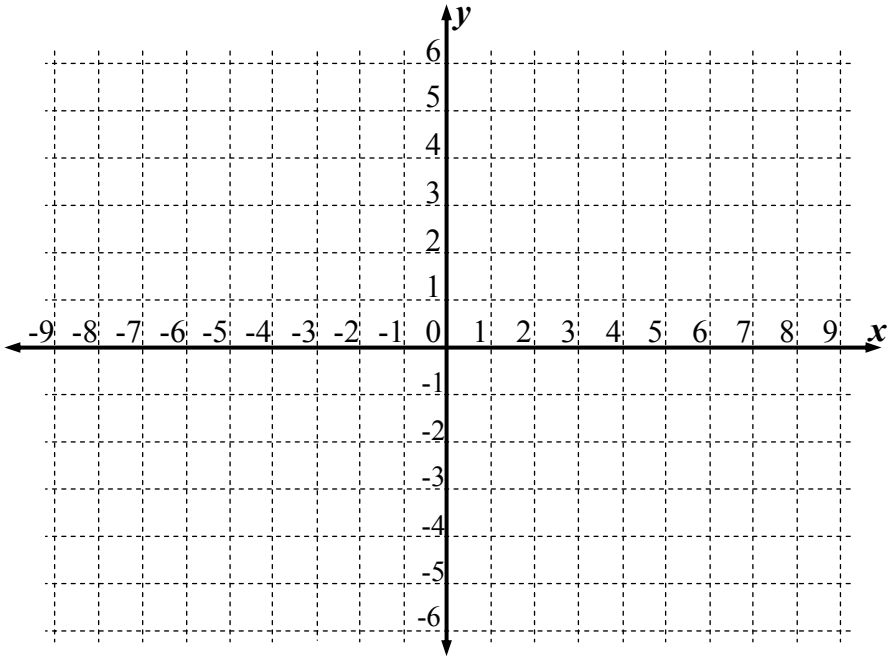
Plot the points and use a ruler to rule a line between the two points and find the midpoint. Plot the midpoint on the line record its co-ordinates. Write letters in pencil, as you may need to move them later!



Steps: Plot the points on the number plane.
Rule a line in between the two points.
Plot the midpoint, call it 'M'.
Write the co-ordinate for the midpoint.

1 *A* (-7, 5) and *H* (-3, 3).

Midpoint: (___ , ___)

Label the midpoint '*M*' on the number plane

2 *G* (8, -2) and *E* (2, -5).

Midpoint: (___ , ___)

3 *L* (-2, 6) and *F* (0, 4).

Midpoint: _____

4 *B* (7, 3) and *D* (-3, -1).

Midpoint: _____

5 *N* (-1, 2) and *P* (5, 6).

Midpoint: _____

6 *K* (-9, 3) and *H* (-3, 3).

Midpoint: _____

7 *C* (-9, -5) and *F* (0, 4).

Midpoint: _____

8 *J* (-6, -6) and *D* (-3, -1).

Midpoint: _____

9 *A* (-7, 5) and *F* (0, 4).

Midpoint: _____

10 *B* (7, 3) and *G* (8, -2).

Midpoint: _____

11 *G* (8, -2) and *D* (-3, -1).

Midpoint: _____

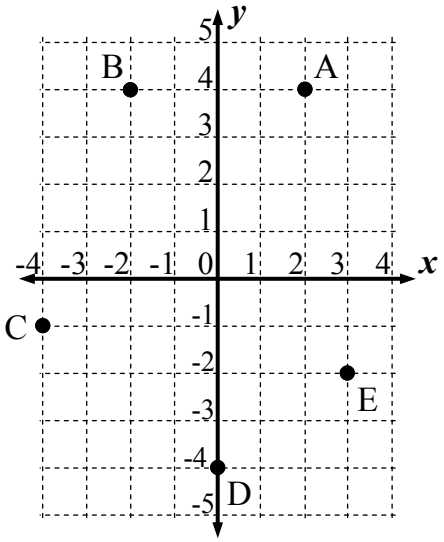
12 *C* (-9, -5) and *K* (-9, 3).

Midpoint: _____

13 *C* (-9, -5) and *E* (2, -5).

Midpoint: _____

This time the points are plotted, rule the line, find the midpoint and record all coordinates.



14 Construct *AB* and find '*M*'

A: (___ , ___) *B*: (___ , ___)

Midpoint *M*: (___ , ___)

15 Construct *AD* and find '*M*'

A: (___ , ___) *D*: (___ , ___)

Midpoint *M*: (___ , ___)

16 Construct *CB* and find '*M*'

C: (___ , ___) *B*: (___ , ___)

Midpoint *M*: (___ , ___)

17 Construct *EA* and find '*M*'

E: (___ , ___) *A*: (___ , ___)

Midpoint *M*: (___ , ___)

18 Construct *DE* and find '*M*'

D: (___ , ___) *E*: (___ , ___)

Midpoint *M*: (___ , ___)

Cartesian Plane - Midpoint (Analytical) - All Quadrants (Sheet 2)

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Find the average of these two numbers. Add them, press '=' and then divide by 2. Always write negatives in brackets.

1 -6 and -12

$$\bar{x} = \frac{(\square) + (\square)}{2} = \square$$

Calc: [−](-) 6 + [−](-) 1 2 = ÷ 2 =

2 -7 and 21

$$\bar{x} = \frac{(\square) + \square}{2} = \square$$

3 6 and -12

$\bar{x} =$

4 -4 and -9

$\bar{x} =$

With halves use '½' not '.5'

Find the midpoint of the interval that joins these two points. Find two averages.

Example

Find the midpoint of the interval joining (-4, -3) and (8, -11).

x_1 y_1 x_2 y_2

$$\bar{x} = \frac{(-4) + 8}{2} = 2$$

$$\bar{y} = \frac{(-3) + (-11)}{2} = -7$$

$M(\bar{x}, \bar{y}) = (2, -7)$

5 (2, -3) and (-6, 9).

$$\bar{x} = \frac{\square + (\square)}{2} = \square$$

$$\bar{y} = \frac{(\square) + \square}{2} = \square$$

$M(\bar{x}, \bar{y}) = (\square, \square)$

6 (-1, -6) and (-3, 10).

$$\bar{x} = \frac{(\square) + (\square)}{2} = \square$$

$$\bar{y} = \frac{(\square) + \square}{2} = \square$$

$M(\bar{x}, \bar{y}) = (\square, \square)$

7 (7, -5) and (-3, 9).

$\bar{x} =$

$\bar{y} =$

$M(\bar{x}, \bar{y}) = (\square, \square)$

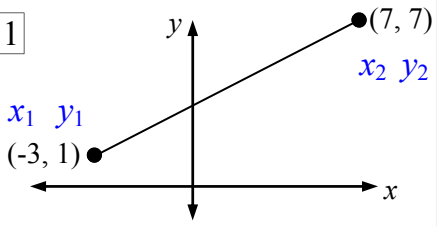
8 (-9, -2) and (-1, -9).

9 (3, 8) and (-3, -6).

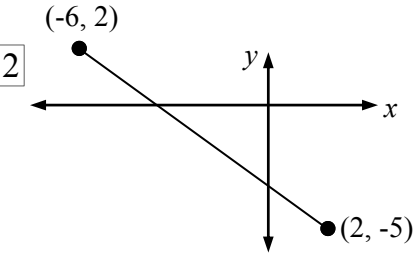
10 (0, -5) and (-10, 8).

Use the same method, but this time get your information from a sketch. Label points (x_1, y_1)…

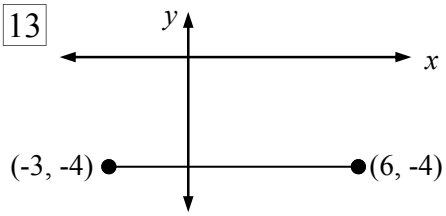
11



12



13



Cartesian Plane - Introduction to Gradient (Positive) (Sheet 1)

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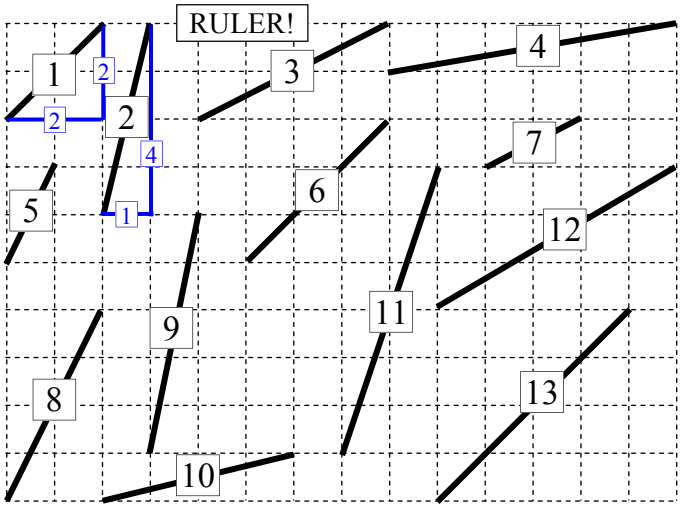
RULER!



Create 'gradient triangles' for the above intervals. Then write the 'rise' and the 'run' on each triangle. The first two are done. Find the gradient for each.

1 $m = \frac{\square}{\square} = \square$

2 $m = \frac{\square}{\square} = \square$

3 $m = \frac{\square}{\square} = \frac{\square}{\square}$

4 $m = \frac{\square}{\square}$

Calc: 2 ▪ 4 =

5 $m = \frac{\square}{\square} = \square$

6 $m = \frac{\square}{\square} = \square$

7 $m = \frac{\square}{\square}$

8 $m = \frac{\square}{\square} = \square$

9 $m = \frac{\square}{\square} = \square$

10 $m = \frac{\square}{\square}$

11 $m = \frac{\square}{\square} = \square$

12 $m = \frac{\square}{\square}$

13 $m = \frac{\square}{\square} = \square$

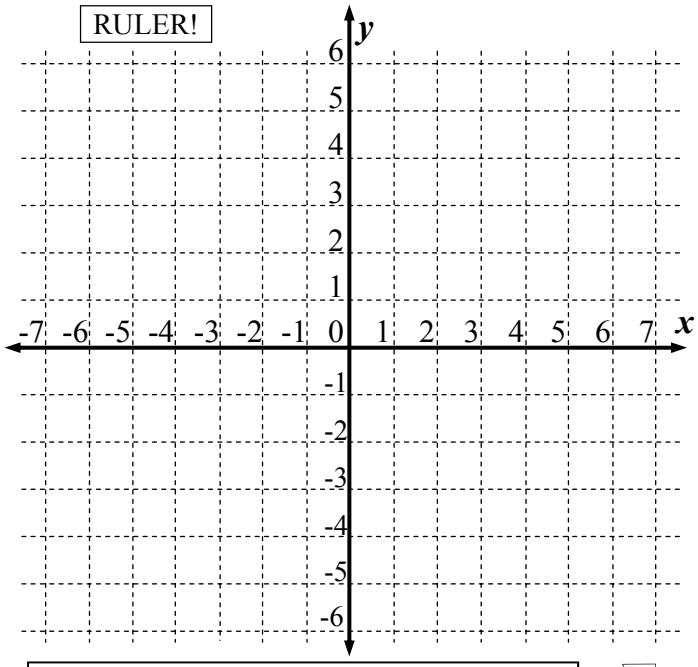
14 Which of the intervals are parallel (have the same gradient)?

a) Q3 || Q□

b) Q5 || Q□

c) Q1 || Q□ || Q□

RULER!



Plot the coordinates, then join them with an interval. Calculate the gradient for the interval by creating a gradient triangle. Use a ruler.

15 *A* (1, 2) and *B* (2, 6). $m = \frac{\square}{\square} = \square$

16 *C* (1, -2) and *D* (7, 4). $m = \frac{\square}{\square} = \square$

17 *E* (-7, -5) and *F* (-5, 3). $m = \frac{\square}{\square} = \square$

18 *G* (-7, 4) and *H* (-3, 6). $m = \frac{\square}{\square} = \frac{\square}{\square}$

19 *J* (-2, -6) and *K* (6, -2). $m = \frac{\square}{\square} = \frac{\square}{\square}$

20 *Q* (-5, -3) and *R* (-1, 1). $m = \frac{\square}{\square} = \square$

21 Which of the intervals are parallel? Use the letters on the interval to complete these:

GH || □ (2 letters) *AB* || □ *CD* || □

Cartesian Plane - Introduction to Gradient (Negative) (Sheet 2)

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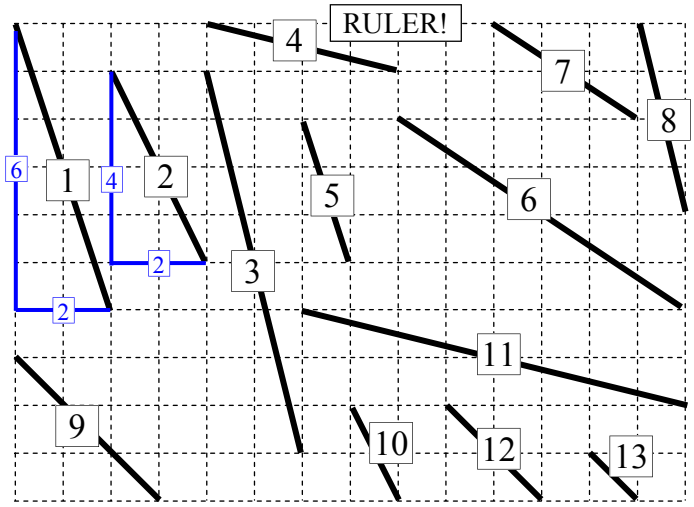
RULER!



Create 'gradient triangles' and write the 'rise' and the 'run' on each triangle, all positive numbers. Find the gradient and write a negative sign '-' in front of your answer.

1 $m =$ ☐/☐ $=$ ☐

2 $m =$ ☐/☐ $=$ ☐

3 $m =$ ☐/☐ $=$ ☐

4 $m =$ ☐/☐

5 $m =$ ☐/☐ $=$ ☐

6 $m =$ ☐/☐ $=$ ☐/☐

7 $m =$ ☐/☐

8 $m =$ ☐/☐ $=$ ☐

9 $m =$ ☐/☐ $=$ ☐

10 $m =$ ☐/☐ $=$ ☐

11 $m =$ ☐/☐ $=$ ☐/☐

12 $m =$ ☐/☐ $=$ ☐

13 $m =$ ☐/☐ $=$ ☐

14 Which of the intervals are parallel?

a) Q1 || Q☐

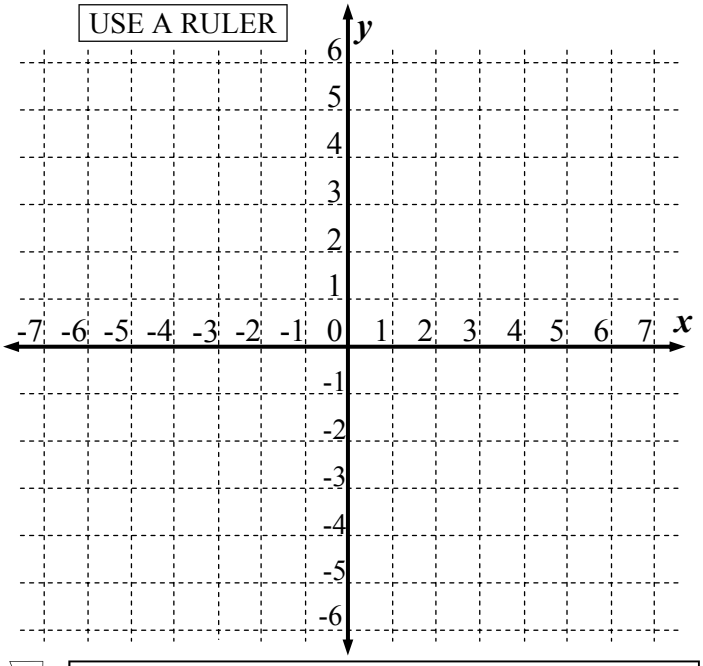
b) Q2 || Q☐

c) Q3 || Q☐

d) Q4 || Q☐

e) Q9 || Q☐ || Q☐

USE A RULER



Plot the coordinates, then join them with an interval. Calculate the gradient for the interval by creating a gradient triangle. **Use positive numbers** on the gradient triangles, but final answers will be negative.

15 A (6, 6) and B (7, 1). $m =$ ☐/☐ $=$ ☐

16 C (0, 5) and D (5, 0). $m =$ ☐/☐ $=$ ☐

17 E (-3, 3) and F (6, -3). $m =$ ☐/☐ $=$ ☐/☐

18 G (-5, 6) and H (-3, -4). $m =$ ☐/☐ $=$ ☐

19 J (-7, -2) and K (-3, -6). $m =$ ☐/☐ $=$ ☐

20 L (1, 6) and P (4, 4). $m =$ ☐/☐

21 Which of the intervals are parallel? Use the letters on the interval to complete these:

AB || ☐ EF || ☐ JK || ☐

Cartesian Plane - Gradient (Sheet 1)

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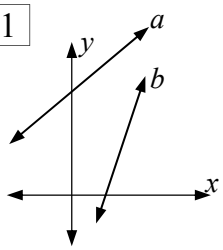
State whether the following have a positive or negative gradient.

Up to the left is -ve

Up to the right is +ve

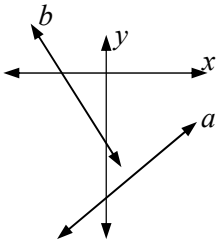
1



a) _____ Positive or Negative

b) _____ Positive or Negative

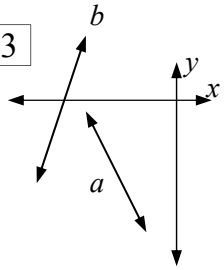
2



a) _____

b) _____

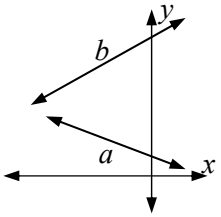
3



a) _____

b) _____

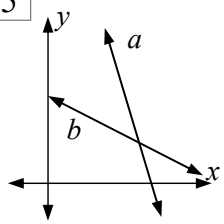
4



a) _____

b) _____

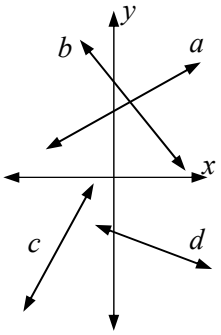
5



a) _____

b) _____

6



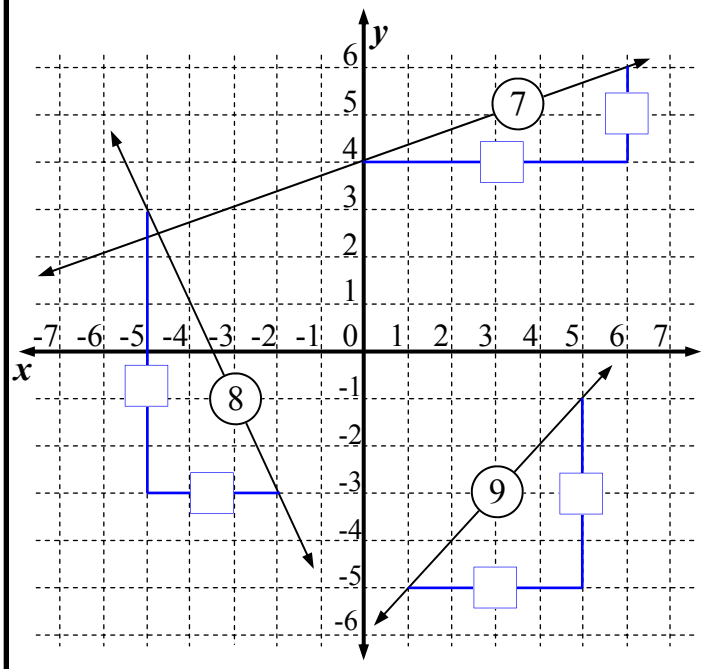
a) _____

b) _____

c) _____

d) _____

These lines have gradient triangles installed! Write the rise and run in the boxes on the triangles sides, then find the gradient. Make sure you remember to check for positive and negative gradient at the end.



7 $m = \frac{\square}{\square} = \frac{\square}{\square}$

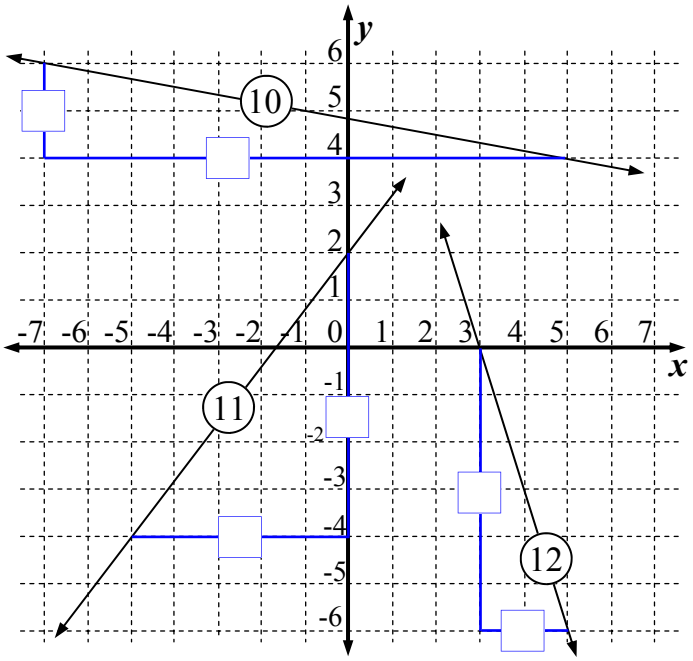
8 $m = \frac{\square}{\square} = \square$

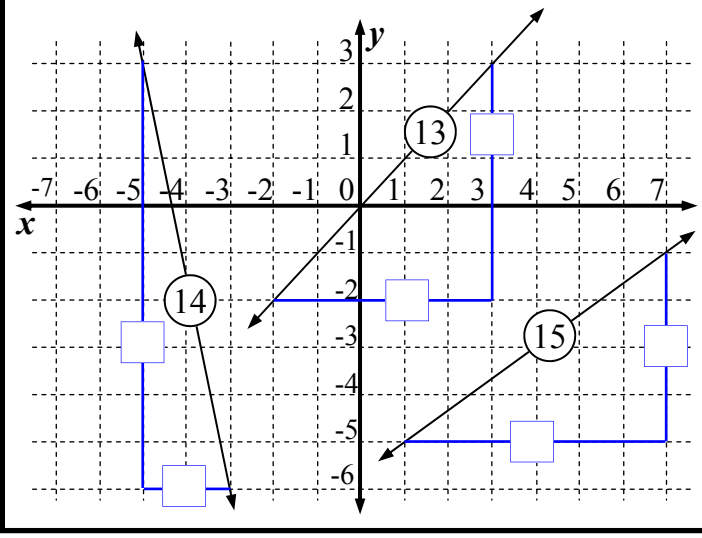
9 $m = \frac{\square}{\square} = \square$

10 $m = \frac{\square}{\square} = \frac{\square}{\square}$

11 $m = \frac{\square}{\square}$

12 $m = \frac{\square}{\square} = \square$





13 $m = \frac{\square}{\square} = \square$

14 $m = \frac{\square}{\square}$

15 $m = \frac{\square}{\square} = \frac{\square}{\square}$

Cartesian Plane - Gradient (Sheet 2)

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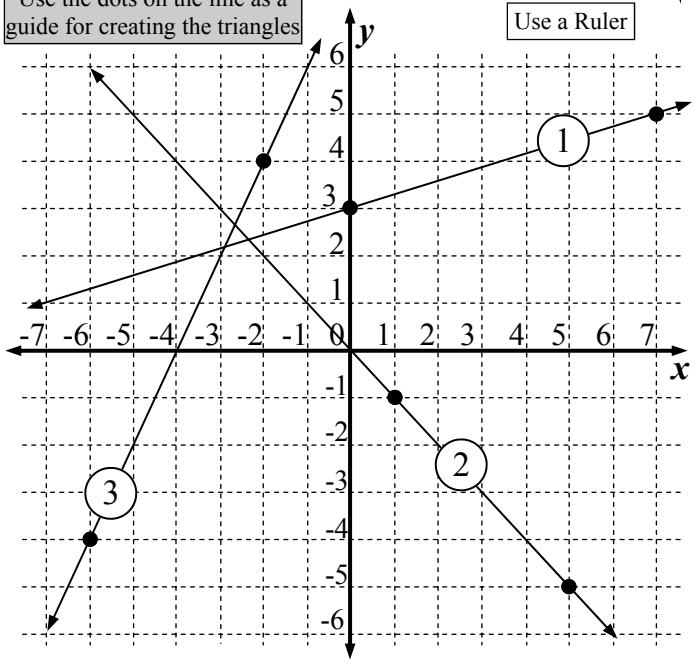
Find the gradient for these lines. Create gradient triangles and remember your positive and negatives.

Use the dots on the line as a guide for creating the triangles

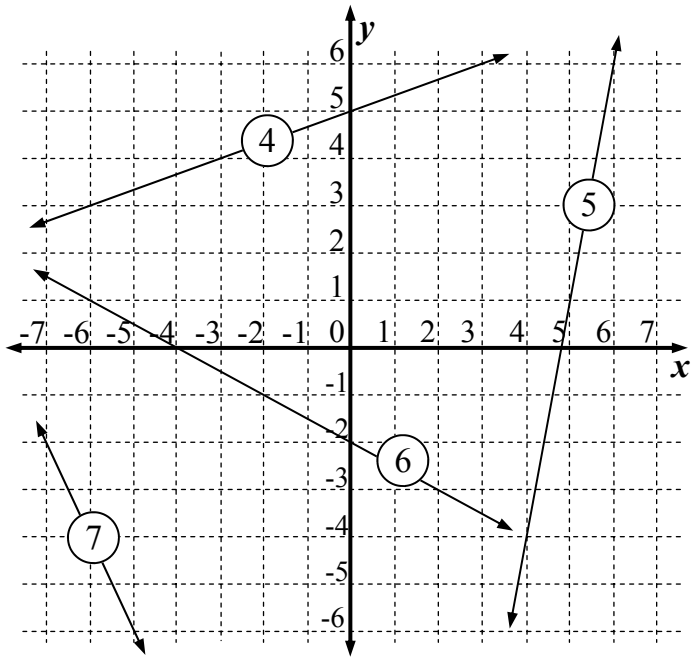
Use a Ruler



1 $m = \frac{\square}{\square}$

2 $m = \frac{\square}{\square} = \square$

3 $m = \frac{\square}{\square} = \square$

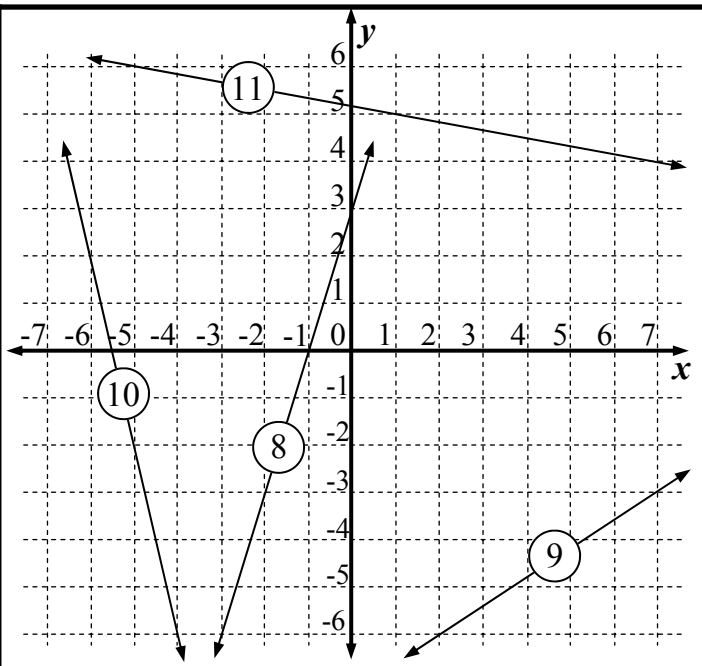


4 $m = \frac{\square}{\square} = \frac{\square}{\square}$

5 $m = \frac{\square}{\square} = \square$

6 $m = \frac{\square}{\square} = \frac{\square}{\square}$

7 $m = \frac{\square}{\square} = \square$

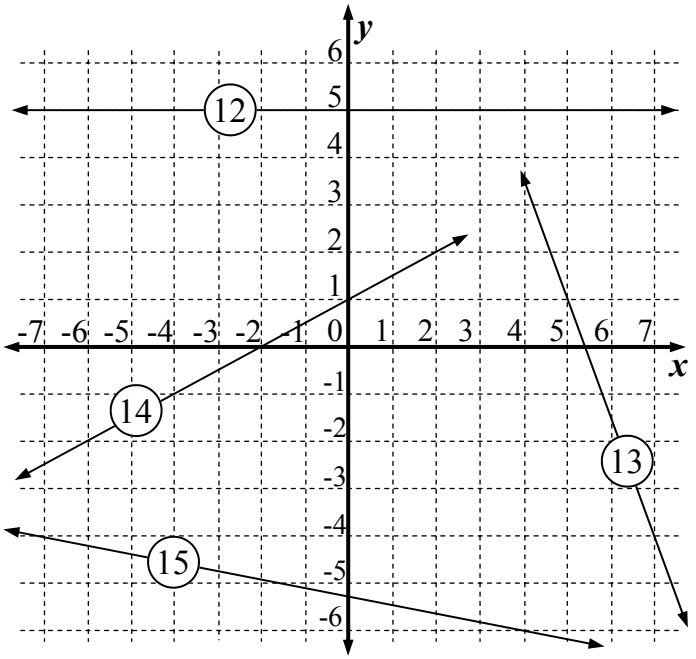


8 $m =$ _____

9 $m =$ _____

10 _____

11 _____



12 _____

13 _____

14 _____

15 _____

Cartesian Plane - Distance - Positive Quadrant (Sheet 1)

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Calculate these square roots, round your answer to 1 d.p.

1 $\sqrt{43} =$ ☐.☐ Round to 1 d.p.

Calc: √ 4 3 =

2 $\sqrt{28} =$ ☐

3 $\sqrt{75} =$ ☐

4 $\sqrt{66} =$ ☐

5 $\sqrt{59} =$ ☐

Calculate the additions of two squared numbers.

6 $8^2 + 4^2 =$ ☐

Calc: 8 x^2 + 4 x^2 =

7 $5^2 + 7^2 =$ ☐

8 $6^2 + 3^2 =$ ☐

9 $4^2 + 10^2 =$ ☐

10 $2^2 + 8^2 =$ ☐

Combine the two operations. Add the squares and square root the answer.

11 $8^2 + 5^2 =$ ☐

Get your answer, then write it here

$\sqrt{\square} =$ ☐

Calc:

Then square root (1 d.p.) √ ANS =

12 $4^2 + 9^2 =$ ☐

$\sqrt{\square} =$ ☐

13 $1^2 + 7^2 =$ ☐

$\sqrt{\square} =$ ☐

14 $6^2 + 6^2 =$ ☐

$\sqrt{\square} =$ ☐

Now use Pythagoras Theorem to calculate the length of an interval. Use 'd' to represent the distance between the two plotted points. (1 d.p.)

15

$d^2 = \square^2 + \square^2$

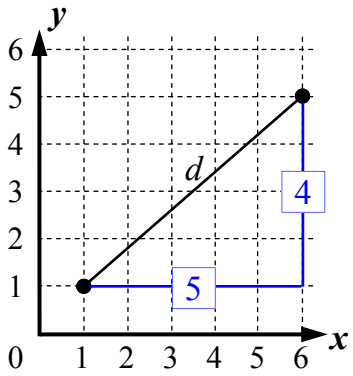
$d^2 = \square$

$d = \sqrt{\square}$ Rewrite

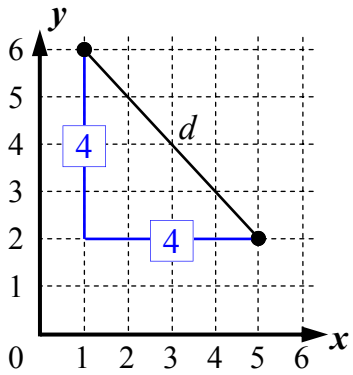
Calc: √ ANS =

$d =$ ☐.☐ *units*

(1 d.p.)



16



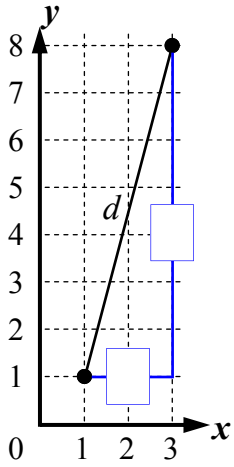
$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d =$ ☐ *units*

17



Now write the side lengths in the boxes.

$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d =$ ☐ *units*

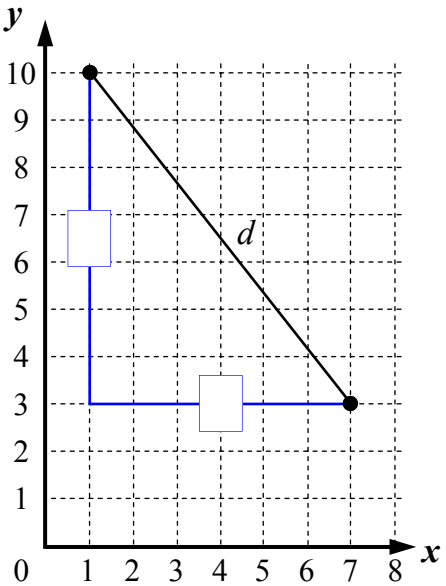
18

$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d =$ ☐ *units*



Cartesian Plane - Distance - Positive Quadrant (Sheet 2)

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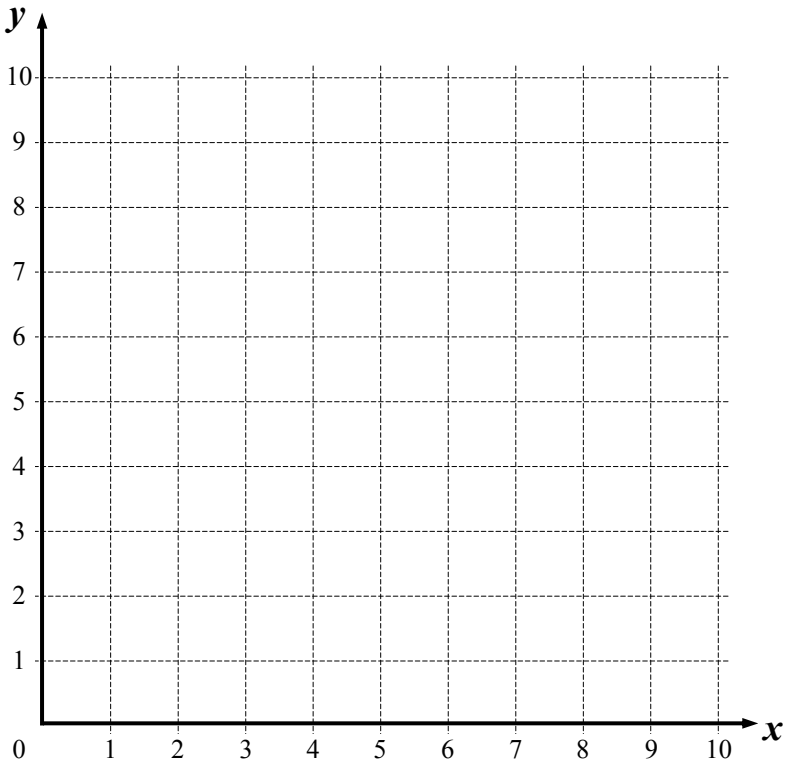
Plot the two points on the graph and rule an interval between them. This will be the hypotenuse of a right angle triangle. Draw the two short sides then use Pythagoras to find the interval length. (1 d.p.)



1 (7, 10) and (10, 6). Plot right angle at (10, 10).

$d^2 = \square^2 + \square^2$

Calc: 3 x^2 + 4 x^2 =

$d^2 =$ ☐

Rewrite

$d = \sqrt{\square}$

Calc: $\sqrt{\blacksquare}$ ANS =

$d =$ ☐ *units*

(1 d.p.)

2 (6, 10) and (1, 9). Plot right angle at (1, 10).

$d^2 = \square^2 + \square^2$

$d^2 =$ ☐

$d = \sqrt{\square}$

$d =$ ☐ *units*

(1 d.p.)

3 (7, 10) and (9, 1). Plot right angle at (7, 1).

$d^2 = \square^2 + \square^2$

$d^2 =$ ☐

$d = \sqrt{\square}$

$d =$ ☐ *units*

4 (2, 4) and (0, 8). Plot right angle at (0, 4).

$d^2 =$

$d^2 =$

$d =$

$d =$

5 (4, 4) and (4, 8).

$d =$

Now you have place the right angle yourself. Find the distance 'd' between these two points.

6 (0, 2) and (7, 0).

Right angle at (☐ , ☐)

$d^2 =$

$d^2 =$

$d =$

$d =$

7 (2, 2) and (6, 9).

Right angle at (☐ , ☐)

8 (9, 5) and (10, 1).

Right angle at (☐ , ☐)

9 (1, 9) and (9, 5).

Right angle at (☐ , ☐)

Cartesian Plane - Distance - All Quadrants (Sheet 1)

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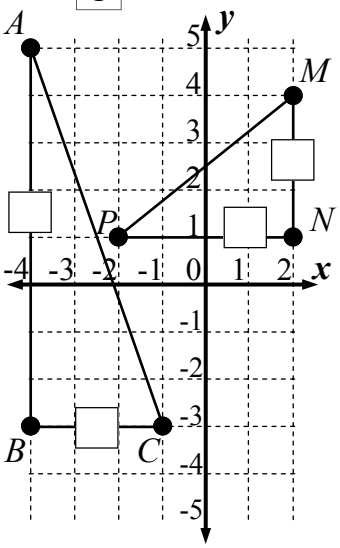
Write the lengths of the short sides in the boxes provided on the number plane.

1



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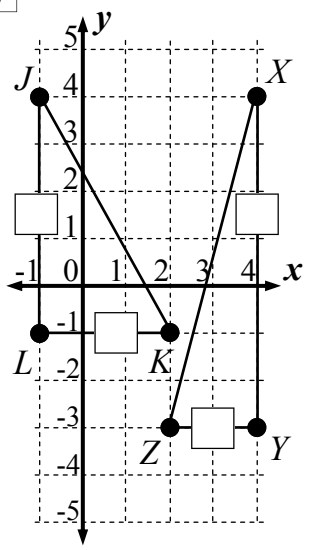
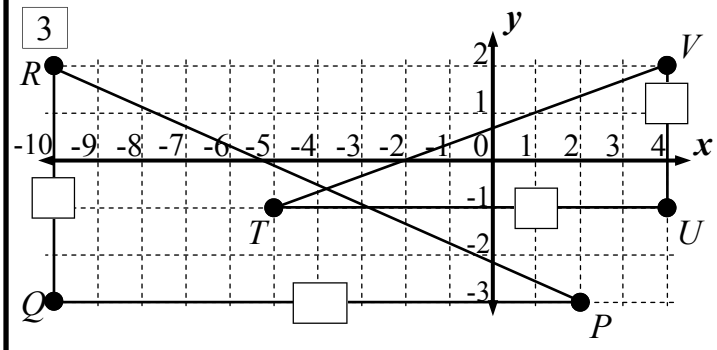
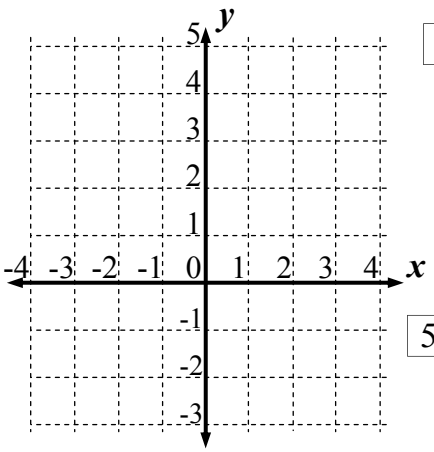


3



Plot the pair of points, then create a right angle triangle on the number plane. Find the two short side lengths. Plot Q4 and Q5 on the first number plane.



4 (4, 5) & (1, -3).

Vertical Length : ☐

Horizontal Length : ☐

5 (-3, 4) & (-1, -2).

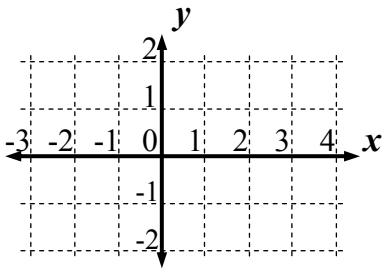
Vertical Length : ☐

Horizontal Length : ☐

6 (4, -2) & (-1, 2).

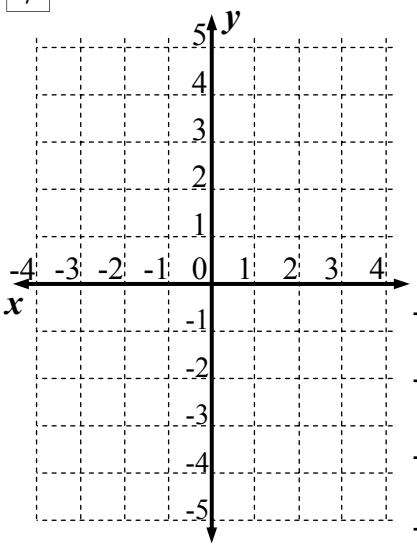
Vertical Length : ☐

Horizontal Length : ☐



Now use Pythagoras to calculate the distance between the two plotted points. Find the short side lengths first. Answer to 1 decimal place.

7



(3, 5) & (-1, -3).

Vertical Length : ☐

Horizontal Length : ☐

$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square.\square$ *units*

8 (-4, -4) & (2, 5).

Vertical Length : ☐

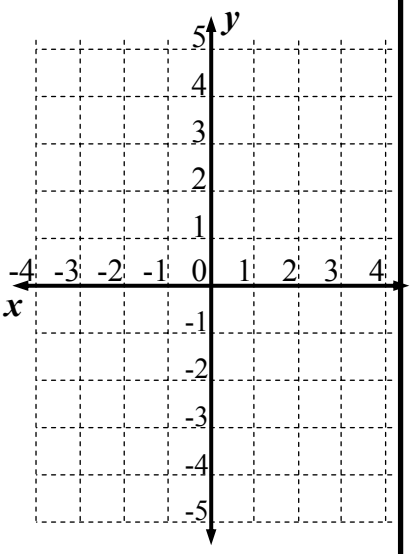
Horizontal Length : ☐

$d^2 = \square^2 + \square^2$

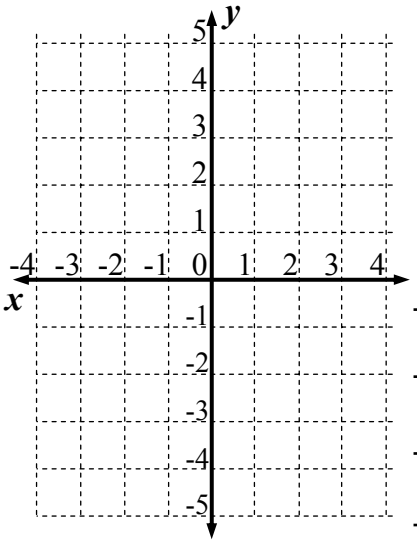
$d^2 = \square$

$d = \sqrt{\square}$

$d = \square\square.\square$ *units*



9



(-4, 2) & (1, -5).

Vertical Length : ☐

Horizontal Length : ☐

$d^2 = \square^2 + \square^2$

$d^2 = \square$

$d = \sqrt{\square}$

$d = \square.\square$ *units*

Cartesian Plane - Distance - All Quadrants (Sheet 2)

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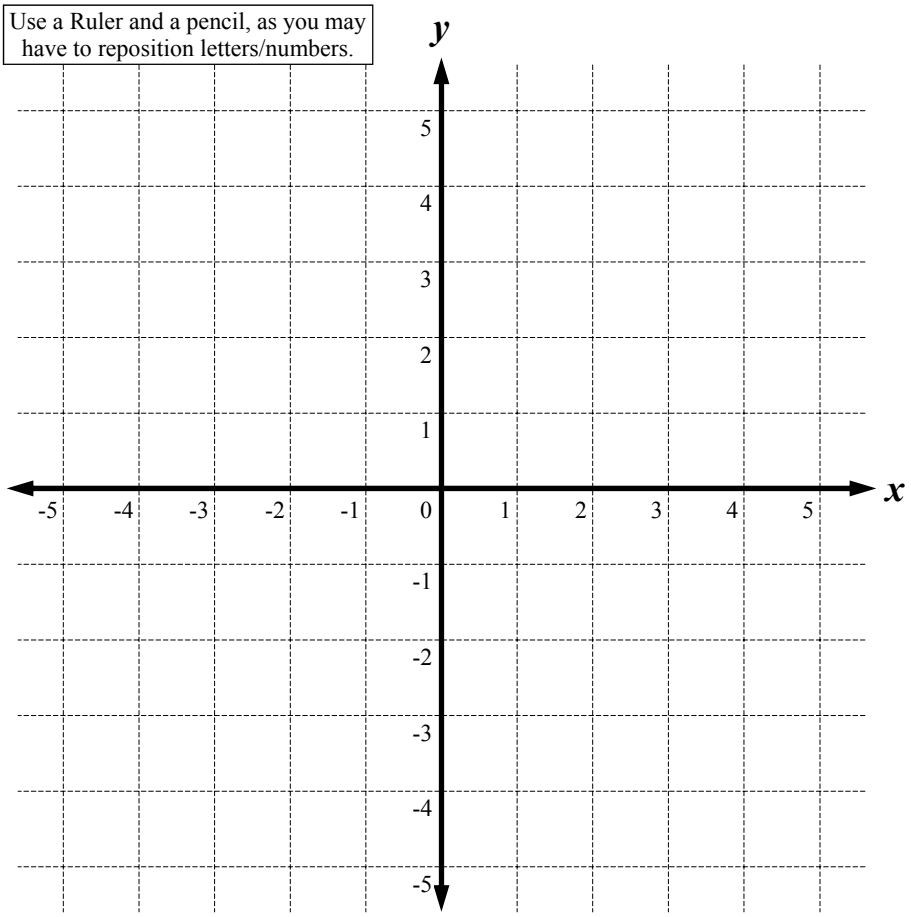
Plot the two points on the graph and draw a line between them, this is the hypotenuse. Draw the two short sides then apply Pythagoras to find the distance between the two points (to 1 d.p.). Note that '*u*' stands for units.

Use a Ruler and a pencil, as you may have to reposition letters/numbers.



1 *K* (-3, 3) and *L* (4, 5). Label right angle *J* at (4, 3).

JK = ☐ *u* *JL* = ☐ *u*

$KL^2 =$ ☐$^2 +$ ☐^{2}

$KL^2 =$ ☐

KL = $\sqrt{\square}$ Rewrite

KL = ☐.☐ *units*

2 *A* (-5, 4) & *B* (-3, -2). Label right angle *C* at (-5, -2).

AC = ☐ *u* *BC* = ☐ *u*

$AB^2 =$ ☐$^2 +$ ☐^{2}

$AB^2 =$ ☐

AB = $\sqrt{\square}$ Rewrite

AB = ☐.☐ *units*

3 *S* (-2, -4) and *R* (2, 2). Label right angle *T* at (2, -4).

TR = ☐ *u* *TS* = ☐ *u*

$SR^2 =$

$SR^2 =$

SR =

SR =

4 *V* (-5, -4) & *X* (-3, -3). Label right angle *Y* at (-3, -4).

VY = ☐ *u* *XY* = ☐ *u*

$VX^2 =$

$VX^2 =$

VX =

VX =

5 *F* (1, 5) & *T* (5, 1). Label right angle *N*.

FN = *TN* =

6 *U* (0, 5) & *Z* (5, -3). Label right angle *D*.

UD = *ZD* =

7 *E* (4, -2) & *G* (2, -5). Label right angle *H*.

EH = *GH* =

8 *M* (-2, 2) & *Q* (3, -1). Label right angle *P*.

MP = *QP* =

Cartesian Plane - Find A Word

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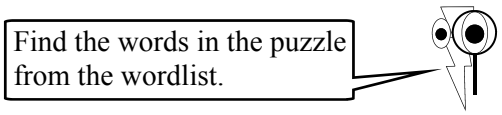

E	H	E	Q	U	A	T	I	O	N	A	X	S	X	A
V	A	T	Q	P	V	W	T	N	I	O	P	D	I	M
I	L	A	Q	L	E	P	Q	E	U	N	A	F	N	X
T	F	N	Q	O	R	E	L	G	N	A	I	R	T	A
I	D	I	I	T	T	U	Q	A	Q	I	N	A	E	M
S	I	D	N	T	I	N	N	V	N	S	A	X	R	A
O	S	R	T	I	C	Q	A	E	A	E	E	X	V	X
P	T	O	E	N	A	X	S	R	O	T	P	X	A	E
X	A	O	R	G	L	E	O	A	D	R	A	O	L	X
A	N	C	C	C	X	G	P	G	X	A	I	J	L	A
X	C	A	E	A	A	O	H	E	E	C	U	G	R	S
E	E	X	P	H	I	N	W	O	D	S	L	Q	I	O
X	L	A	T	N	O	Z	I	R	O	H	I	I	H	N
A	X	Y	T	G	R	A	D	I	E	N	T	R	N	H
E	P	N	E	G	A	T	I	V	E	H	O	R	I	E

WORDLIST

GRADIENT	POINT*	MIDPOINT*	RISE	VERTICAL
POSITIVE	INTERVAL	INTERCEPT	SLOPE	MEAN
HALF	TRIANGLE	PLOTTING	QUADRANT	CARTESIAN
AXES	RUN	NEGATIVE	LINE	UP
DISTANCE	AVERAGE	ACROSS	DOWN	EQUATION
PLANE	HORIZONTAL	PYTHAGORAS	COORDINATE	ORIGIN

*MIDPOINT AND POINT ARE SEPARATE WORDS

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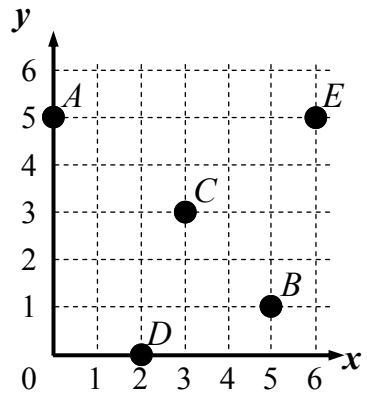
Give the coordinates for the five plotted points.



1 *A* _____

2 *B* _____

3 *C* _____

4 *D* _____

5 *E* _____

Give the coordinates for the six plotted points.

6 *A* _____

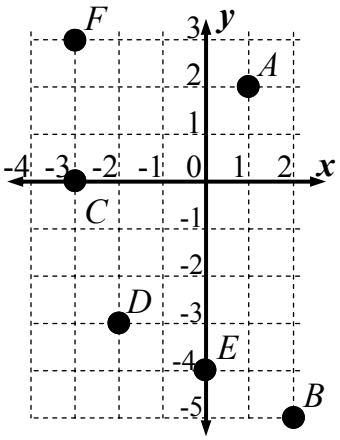
7 *B* _____

8 *C* _____

9 *D* _____

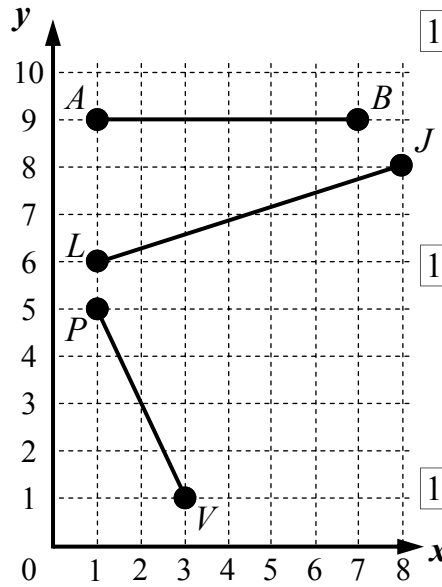
10 *E* _____

11 *F* _____



12 Give the coordinates for the origin _____

Plot the midpoint '*M*' on the intervals, give the coordinates



13 *AB* _____ Midpoint Coordinates

14 *LJ* _____ Midpoint Coordinates

15 *PV* _____ Midpoint Coordinates

Plot the points, find the midpoint coordinates.

16 *A* (-4, -5)
B (-2, 3)

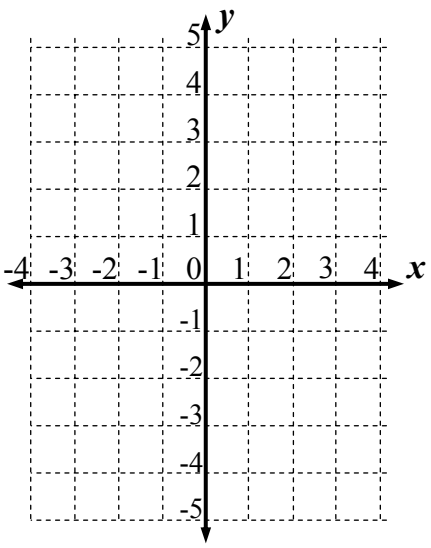
_____ Midpoint of *AB*

17 *F* (-3, 5)
Z (4, 3)

_____ Midpoint of *FZ*

18 *T* (3, -1)
Q (-3, -5)

_____ Midpoint of *TQ*



Calculate the coordinates of the midpoint for these intervals, use:

$$M(\overline{x}, \overline{y}) = \left(\frac{x_1 + x_2}{2} , \frac{y_1 + y_2}{2} \right)$$

19 (4, 6) and (10, 12)

_____ _____

_____ _____

_____

20 (-5, -2) and (9, 8)

_____ _____

_____ _____

_____

21 (-9, -8) and (-2, -2)

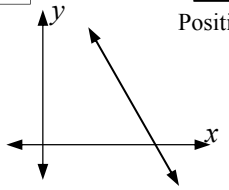
_____ _____

_____ _____

_____

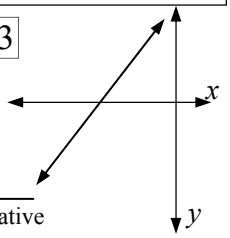
Do these lines have a positive or negative gradient?

22



_____ Positive or negative

23



_____ Positive or negative

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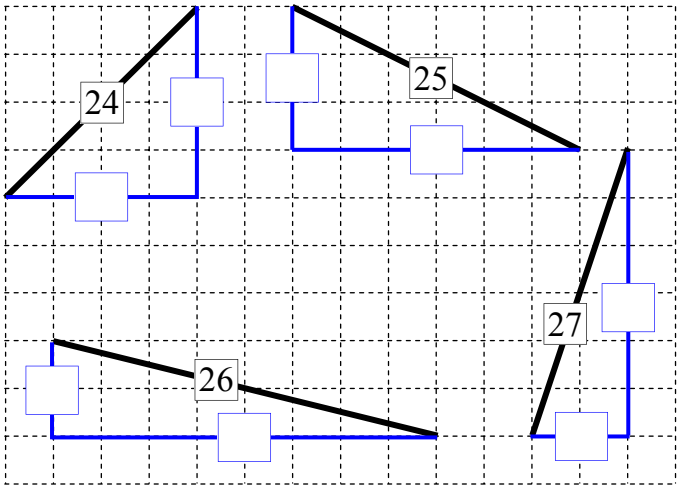
Record the triangle side lengths and calculate the gradient for the following intervals. Simplify when possible.

Use: $m = \frac{rise}{run}$



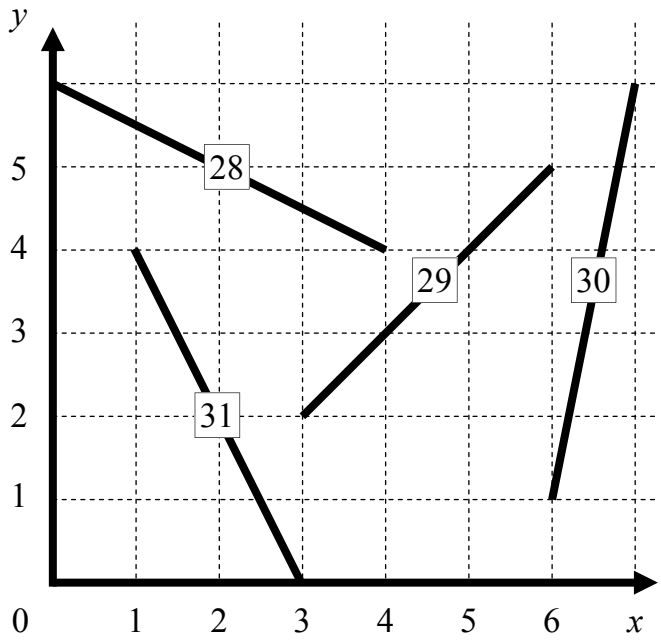
24 $m =$ _____ 25 _____

26 _____ 27 _____

Calculate the gradient for the following intervals.

Use: $m = \frac{rise}{run}$

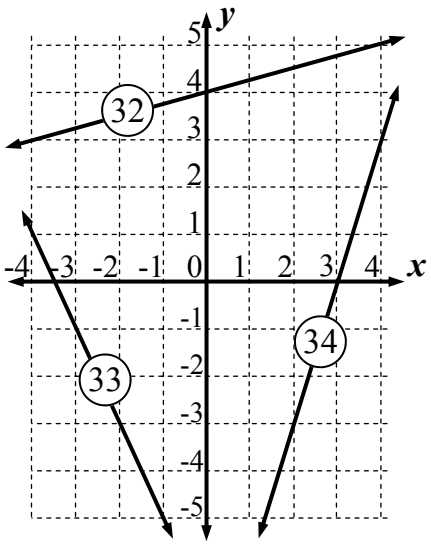
Simplify your answer where possible.



28 _____ 29 _____

30 _____ 31 _____

Calculate the gradient for the following lines. Simplify your answer where possible.



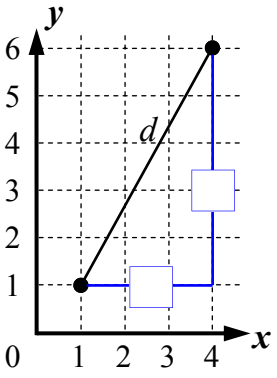
32 _____ 33 _____

34 _____

Calculate the distance between these two points. Use Pythagoras Theorem rounding to 1 d.p.

Use: $c^2 = a^2 + b^2$

35



_____

_____

_____

_____

36 (-3, 2) and (3, -2).

_____

_____

_____

_____