

Student Name

Mathematics Stage 4

LINEAR RELATIONSHIPS

Book 1 Plot and identify points on the Cartesian plane

Version: 260207

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OVERVIEW

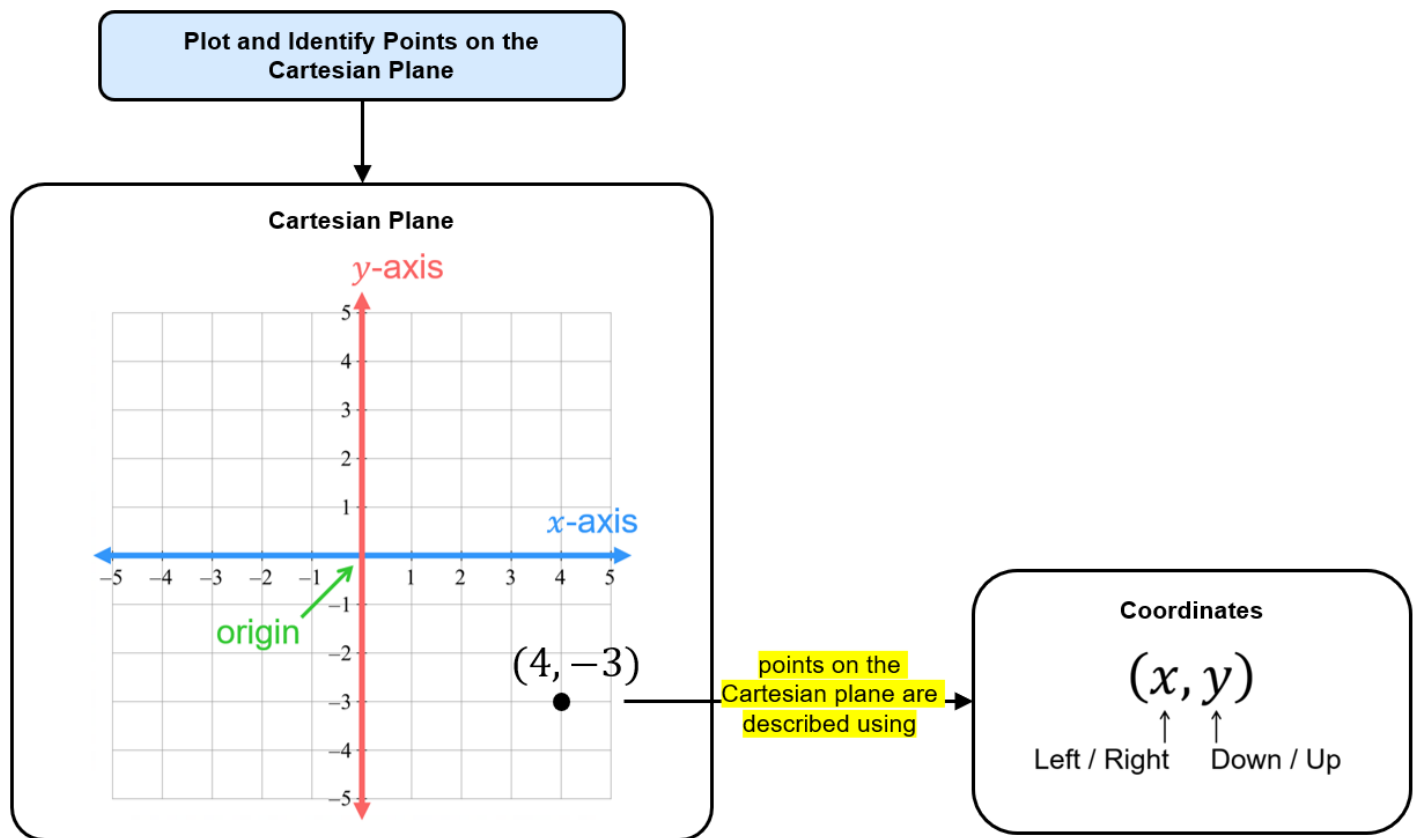
SYLLABUS CONTENT

MA4-LIN-C-01 creates and displays number patterns and finds graphical solutions to problems involving linear relationships

Plot and identify points on the Cartesian plane

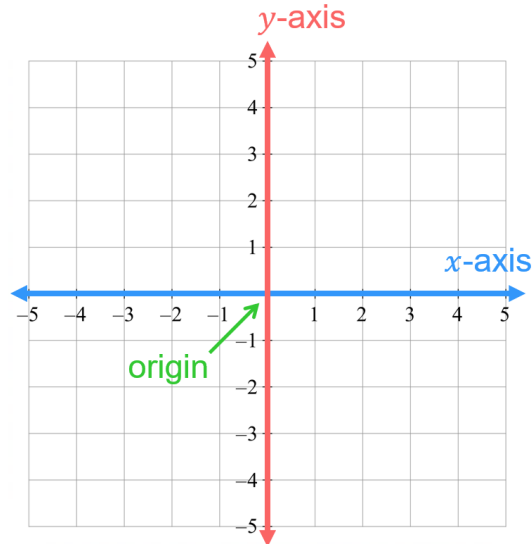
- Plot and label points on the Cartesian plane of given coordinates, including those with coordinates that are not whole numbers
- Identify and record the coordinates of given points on the Cartesian plane, including those with coordinates that are not whole numbers

SUMMARY



IDENTIFY POINTS ON CARTESIAN PLANE

- A **Cartesian plane**, or number plane, is two number lines at right angles to each other.
- The **x-axis** is the **horizontal (left to right)** number line.
- The **y-axis** is the **vertical (up and down)** number line.
- The **origin (0,0)** is where the **x-axis** and **y-axis** intersect.



COORDINATES

- A **coordinate** (x, y) tells us the position of a point on a Cartesian plane compared to the origin.

(x, y)
 ↑ ↑
 Left / Right Down / Up

Example Interpret coordinates.

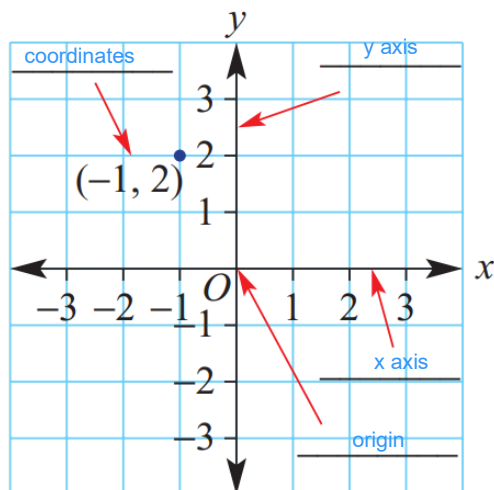
$\begin{matrix} \rightarrow & \uparrow \\ (4, 3) \end{matrix}$	$(-1, -1)$	$(-3, -1)$	$(-6, -2)$
$(3, 2)$	$(-2, -2)$	$(4, -1)$	$(-4, -2)$
$(-3, 2)$	$(-3, -3)$	$(5, -1)$	$(-1, 0)$
$(-4, 2)$	$(3, -1)$	$(6, -1)$	$(7, 2)$

Key ideas

1. A Cartesian plane is a number line and a number line.
2. The horizontal number line is the axis. The vertical number line is the axis.
3. We can label a position on a Cartesian plane using
4. The origin (.....,) is where the two number lines
5. A coordinate is written as (x, y) ; the first number is how much to move, the second is how much to move

1 For the Cartesian plane shown, label these parts:

- x axis
- Origin
- y axis
- Coordinates



2

a To plot (3, 4) you would start at the origin, move 3 units and 4 units

right, up

b To plot (2, -1) you would start at the, move 2 units and 1 unit

origin, right, down

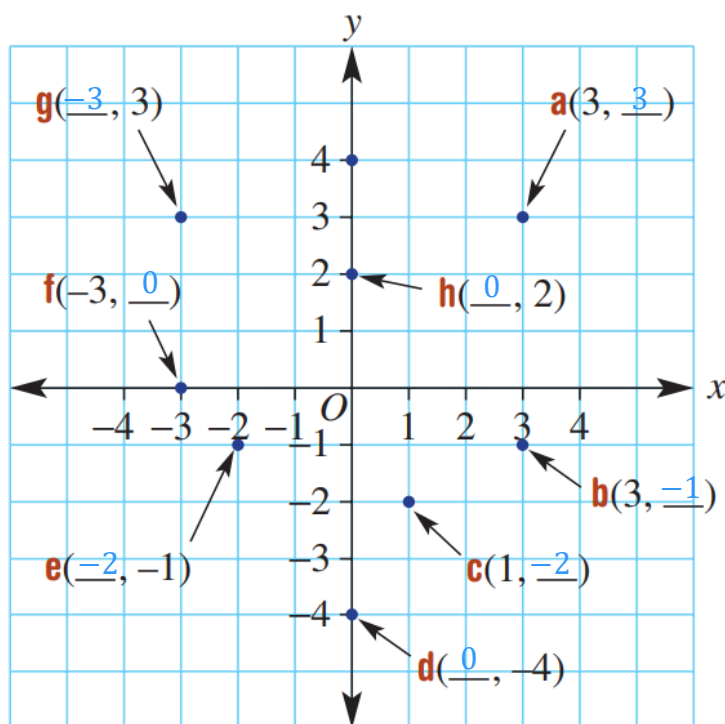
c To plot (-3, 2) you would start at the, move 3 units and 2 units

origin, left, up

d To plot (-1, -4) you would start at the, move 1 unit, and 4 units

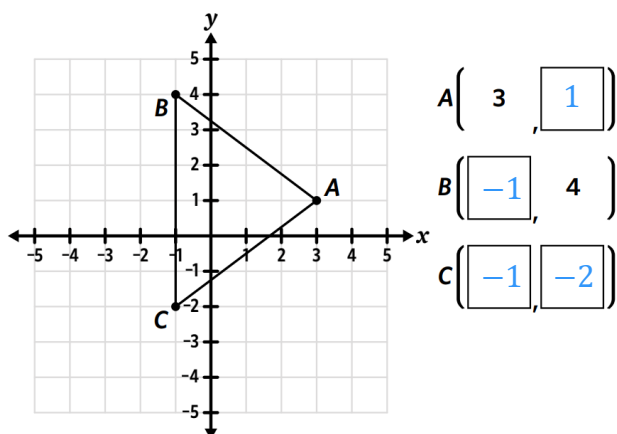
origin, left, down

3 Write the missing number for each of these coordinates.

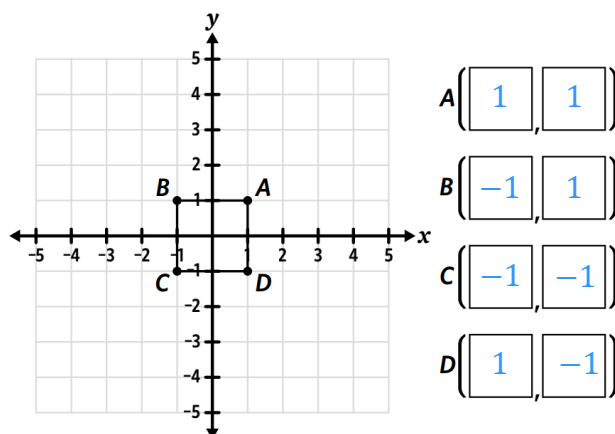


4 Identify the coordinates of these points.

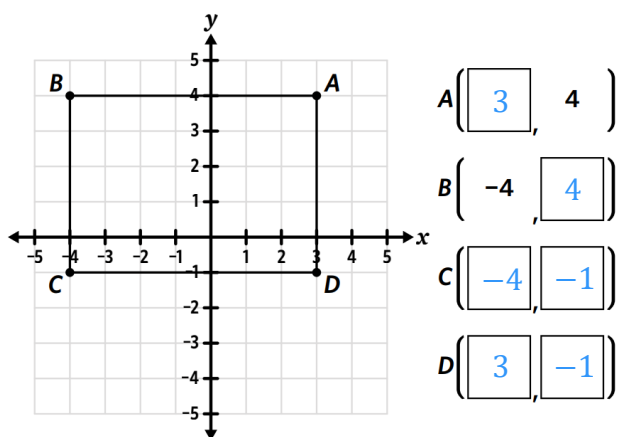
a



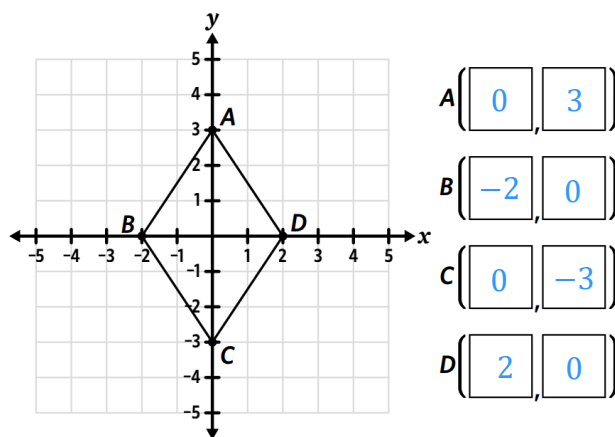
b



c



d



5 Identify the coordinates from the table of values.

a

x	1	2	3	4
y	2	5	8	11
Coordinate	(1,2)	(2,5)	(3,8)	(4,11)

b

x	0	1	2	3
y	1	1.5	2	2.5
Coordinate	(0,1)	(1,1.5)	(2,2)	(3,2.5)

c

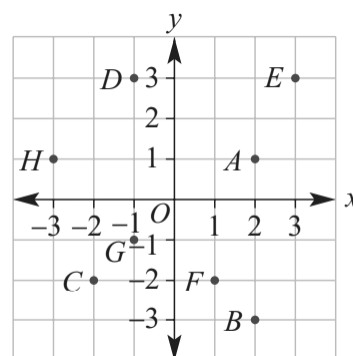
x	-1	0	1	2
y	7	5	3	1
Coordinate	(-1,7)	(0,5)	(1,3)	(2,1)

d

x	-2	-1	0	1
y	14	10	6	2
Coordinate	(-2,14)	(-1,10)	(0,6)	(1,2)

6 Match the points A, B, C, D, E, F, G and H with the given coordinates.

- | | | | | | |
|---|-----------|-------|---|------------|-------|
| a | $(-1, 3)$ | | b | $(2, -3)$ | |
| | | D | | | B |
| c | $(2, 1)$ | | d | $(-2, -2)$ | |
| | | A | | | C |
| e | $(3, 3)$ | | f | $(-3, 1)$ | |
| | | E | | | H |
| g | $(1, -2)$ | | h | $(-1, -1)$ | |
| | | F | | | G |



7 Chloe, Beca and Ed have each written down the coordinates of point P.

Chloe $(4, -3)$ Beca $(-3, 4)$ Ed $(3, 4)$

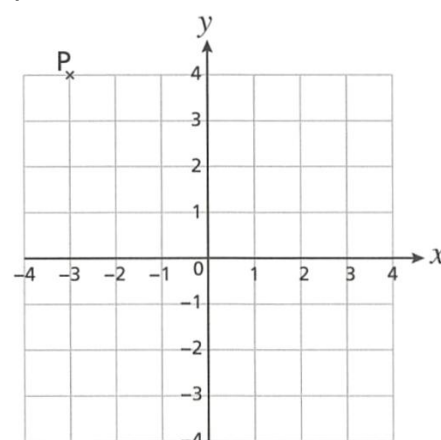
a Who is correct?

Beca

b Explain the mistakes the other two have made.

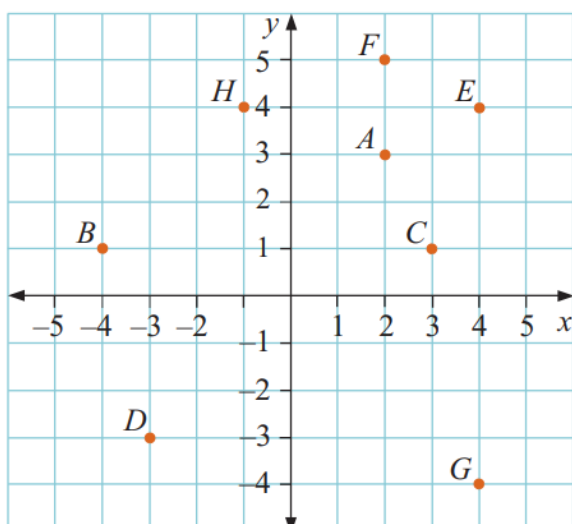
Chloe swapped x and y

Ed didn't use negative for being left of the origin



8 Eight points have been plotted on this number plane.

Write the coordinates of the eight points.



- | | | |
|---|----------------|----------|
| a | (.....,) | (2, 3) |
| b | (.....,) | (-4, 1) |
| c | (.....,) | (3, 1) |
| d | (.....,) | (-3, -3) |
| e | (.....,) | (4, 4) |
| f | (.....,) | (2, 5) |
| g | (.....,) | (4, -4) |
| h | (.....,) | (-1, 4) |

i Name two points with the same x -coordinates.

What do you notice about their positions on the number plane?

A and F. They have the same horizontal position (directly on top of each other)

j Name two points with the same y -coordinates.

What do you notice about their positions on the number plane?

B and C. They have the same vertical position (on the same level as each other)

PLOT POINTS ON CARTESIAN PLANE

Example Plot and label points on a Cartesian plane using coordinates.

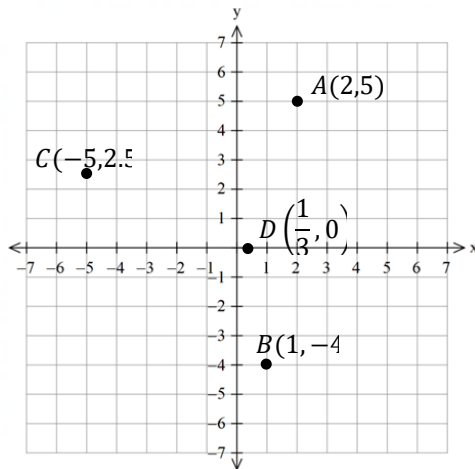
Plot these coordinates.

$A(2, 5)$

$B(1, -4)$

$C(-5, 2.5)$

$D\left(\frac{1}{3}, 0\right)$



When plotting coordinates, where do you start from?

Always start from the , (0,0)

Does the order matter in coordinates?

e.g., (2,5) and (5,2)?

Yes. The first number tells you how much to move or

The second number tells you how much to move or

Label these coordinates.

$A: (-5, 1)$

$B: (-3, 1)$

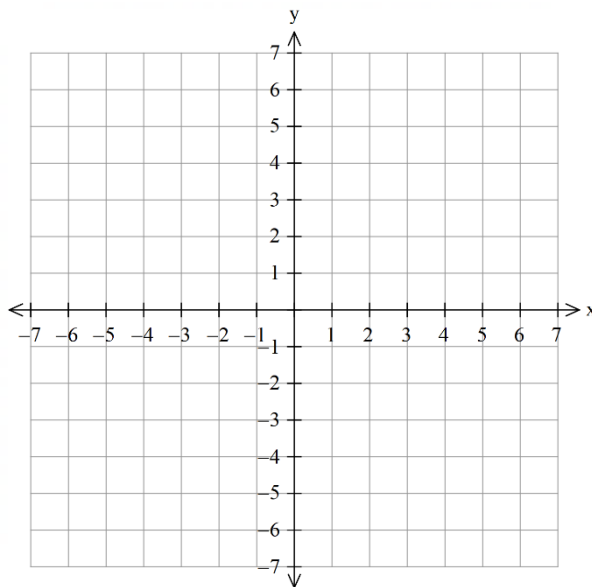
$C: (1, 5)$

$D: (4, 6)$

$E: (3, 3)$

$F: (-1, -1)$

$G: (-1, -3)$



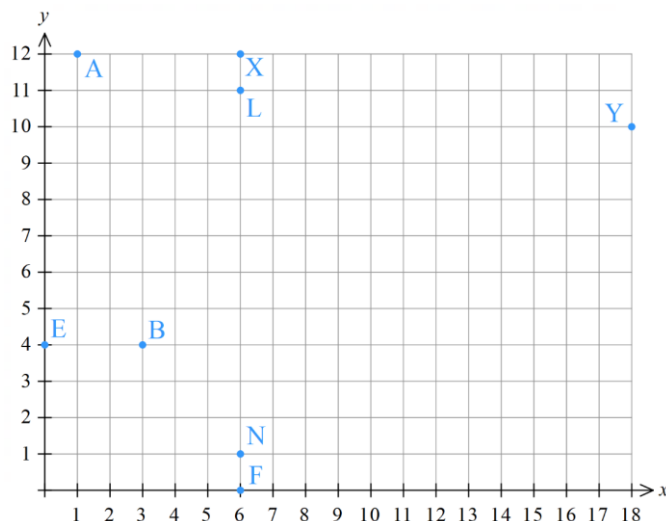
Key ideas

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3. We can label a position on a Cartesian plane using
4. The origin (.....,) is where the two number lines
5. A coordinate is written as (x, y) ; the first number is how much to move, the second is how much to move

1 Plot these points on the Cartesian plane.

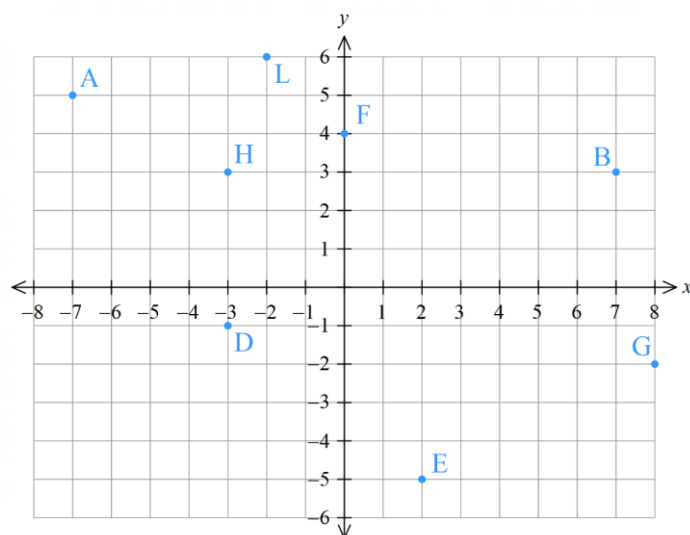
a

- $\rightarrow \uparrow$
 $A(1, 12)$
 $\rightarrow \uparrow$
 $B(3, 4)$
 $\rightarrow \uparrow$
 $Y(18, 10)$
 $\rightarrow \uparrow$
 $X(6, 12)$
 $\rightarrow \uparrow$
 $L(6, 11)$
 $\rightarrow \uparrow$
 $N(6, 1)$
 $\rightarrow \uparrow$
 $E(0, 4)$
 $\rightarrow \uparrow$
 $F(6, 0)$



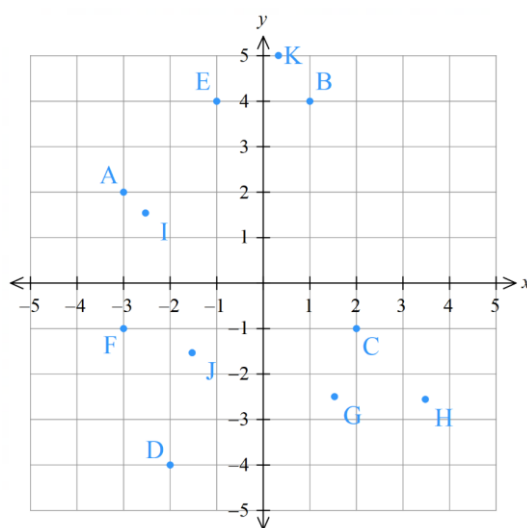
b

- $\leftarrow \uparrow$
 $A(-7, 5)$
 $\leftarrow \uparrow$
 $H(-3, 3)$
 $\rightarrow \downarrow$
 $G(8, -2)$
 $\rightarrow \downarrow$
 $E(2, -5)$
 $\leftarrow \uparrow$
 $L(-2, 6)$
 $\rightarrow \uparrow$
 $F(0, 4)$
 $B(7, 3)$
 $D(-3, -1)$

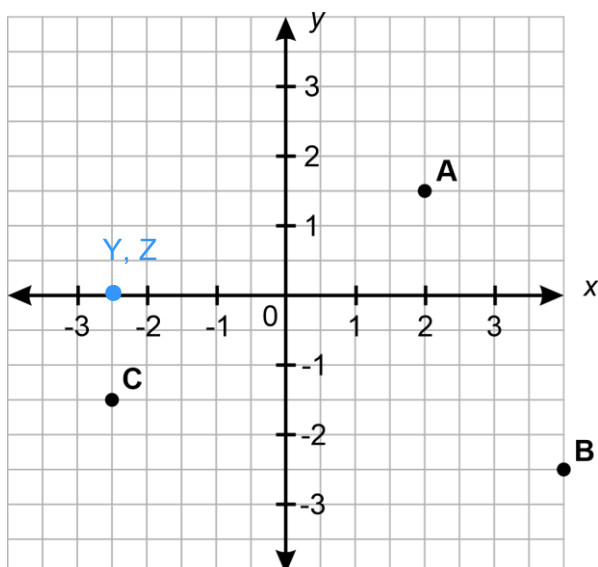


2 Plot these points on the Cartesian plane.

- a** A $(-3, 2)$
b B $(1, 4)$
c C $(2, -1)$
d D $(-2, -4)$
e E $(-1, 4)$
f F $(-3, -1)$
g G $(1.5, -2.5)$
h H $(3.5, -2\frac{1}{2})$
i I $(-2.5, 1.5)$
j J $(-1\frac{1}{2}, -1.5)$
k K $(\frac{1}{3}, 5)$



3



a Identify the coordinates of A

(2, 1.5)

b Identify the coordinates of B

(4, -2.5)

c Identify the coordinates of C

(-2.5, -1.5)

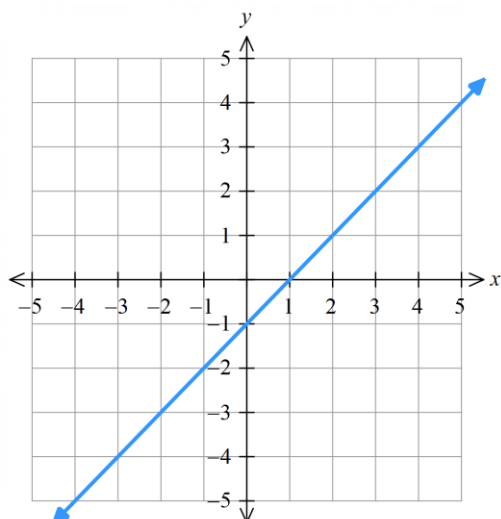
d Label point Y directly above C on the x-axis

e Label the point Z $2\frac{1}{2}$ units left of the origin.

f Write the coordinates of point Z

(-2.5, 0)

4 Write down the coordinates of 8 points that lie on this line.



a (.....,)

b (.....,)

c (.....,)

d (.....,)

e (.....,)

f (.....,)

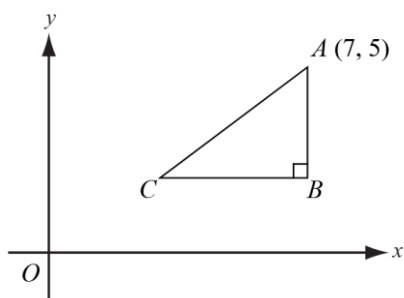
g (.....,)

h (.....,)

Answers will vary.

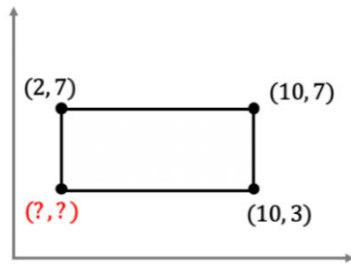
Describe the relationship between x and y .The value of y is x subtract 1.This line can be described by the equation $y = x - 1$. Where do you think this equation comes from?The value of y is x subtract 1. $y = x - 1$

5 NAPLAN C

 AB is parallel to the y -axis. If $AB = 3$, $BC = 4$, and $AC = 5$, what are the coordinates of C ?

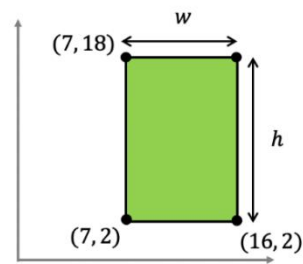
C(3, 2)

- a** What is the coordinate of the missing vertex of the rectangle?



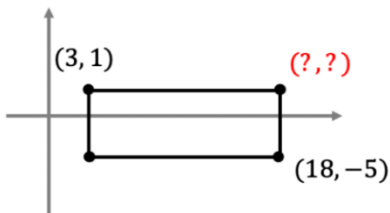
(2, 3)

- b** Determine the height and width of the rectangle.



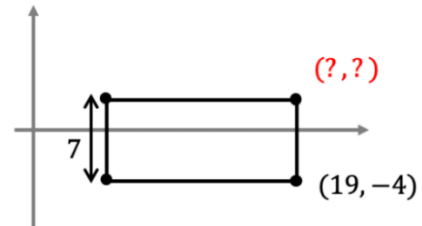
w: 9, h: 16

- c** What is the coordinate of the missing vertex of the rectangle?



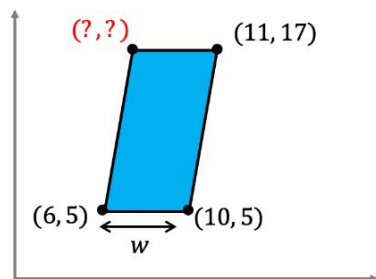
(18, 1)

- d** What is the coordinate of the missing vertex of the rectangle?



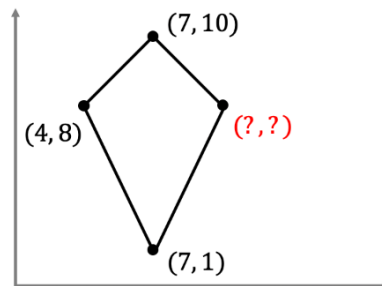
(19, 3)

- e** Find the width of the parallelogram and hence the unknown coordinates.



w: 4, (7, 17)

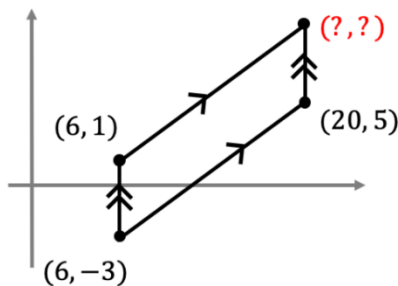
- f** What are the unknown coordinates on this kite?



(10, 8)

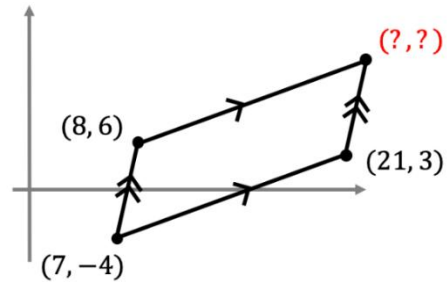
7

- a What are the unknown coordinates in the quadrilateral?



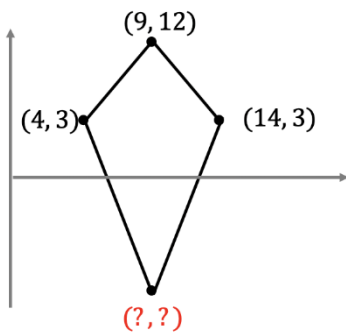
(20, 9)

- b What are the unknown coordinates in the quadrilateral?



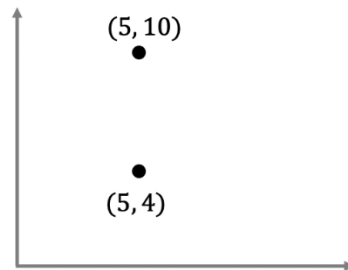
(22, 13)

- c On this kite the height is twice the width. What are the unknown coordinates on this kite?



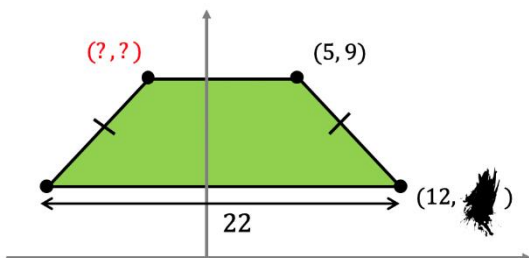
(9, -8)

- d Carmen draws a square on a coordinate grid. All of the coordinates are positive and two of her points are shown. Find the other two points.



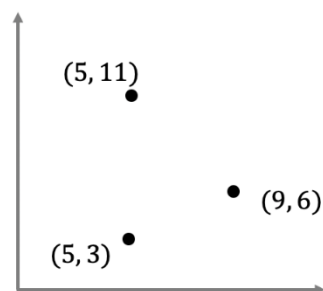
(11, 4) and (11, 10)

- e This shape is an isosceles trapezium. A coordinate, a partial coordinate and a length are shown. Work out the top left coordinate.



(-3, 9)

- f Arjun draws a parallelogram on a coordinate grid. All of the coordinates are positive and three of his points are shown. There are two options for the final point. Find both of the options.



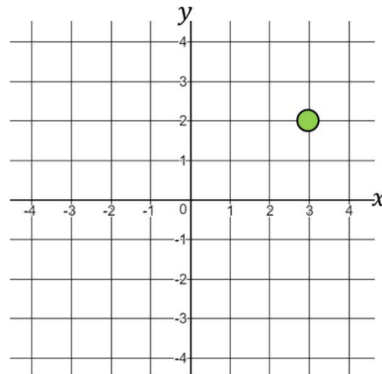
(1, 8) and (9, 14)

CHECK YOUR UNDERSTANDING

Coordinates

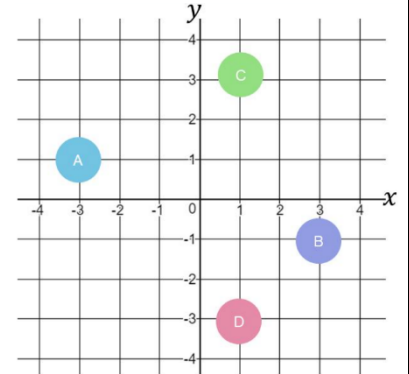
1 What are the coordinates of this point?

- a** (3,2)
- b** (2,3)
- c** (3,3)
- d** (2,2)



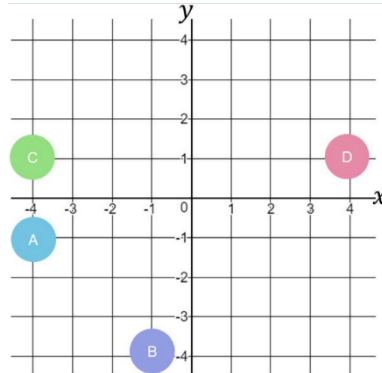
2 Which letter shows (1, -3)

- a**
- b**
- c**
- d**



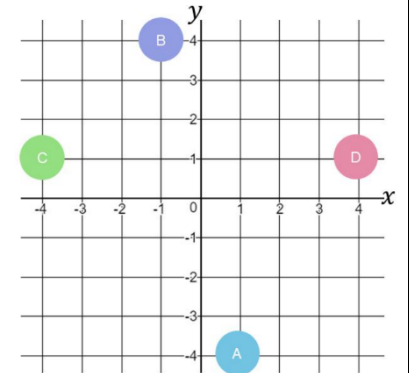
3 Which letter shows (-4, -1)?

- a**
- b**
- c**
- d**



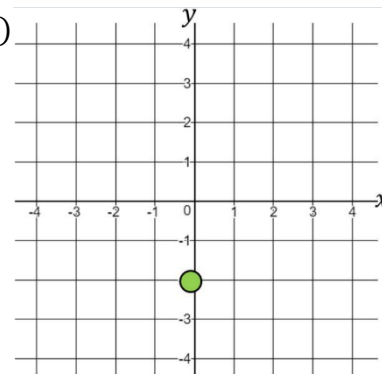
4 Which letter shows (-4,1)

- a**
- b**
- c**
- d**



5 What are the coordinates of this point?

- a** (-2, -2)
- b** (1, -2)
- c** (-2, 0)
- d** (0, -2)



6 Which of these coordinates lie on the y-axis?

- a** (-12,0)
- b** (12,12)
- c** (-12,12)
- d** (0,12)