

Lesson 19 – Equations of Lines in the Form $x=a$ and $y=a$

Starter

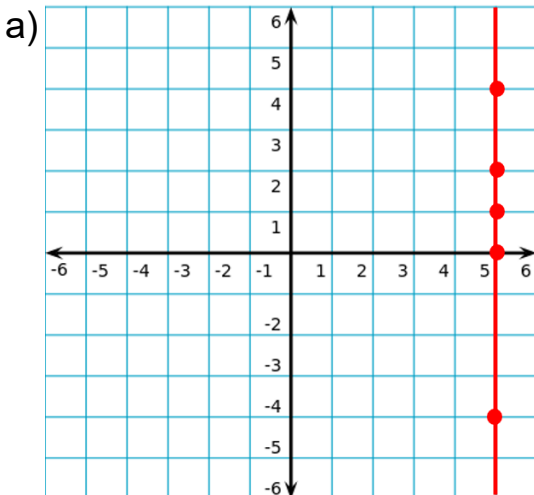
- 1) Write down the value of the digit 4 in the number 3.846
- 2) Find 32% of 400
- 3) Find 30% of 15
- 4) Simplify $\frac{32}{40}$

Starter Answers

- 1) 4 hundredths 2) 128 3) 4.5 4) $\frac{4}{5}$

Example 1

- a) Plot these coordinates: (5, 1) (5, 2) (5, 4) (5, -4) (5, 0)
- b) Join your points together. What do you notice?
- c) Would (5, 18) be on this line? Why?



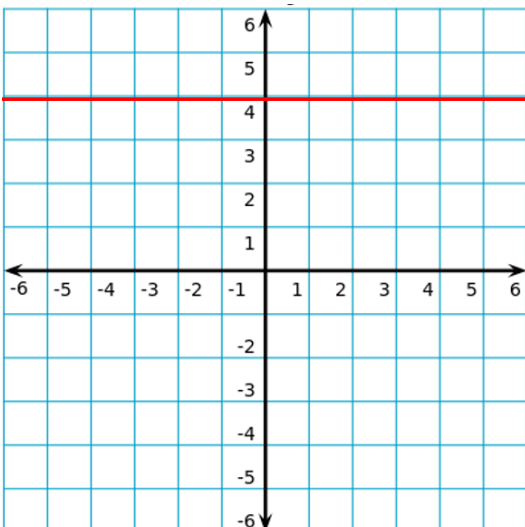
- b) The points form a straight line.
This is because all of the points have an x-coordinate of 5.

(5, 1)
x-coordinate y-coordinate

- c) Yes, the point (5, 18) also has an x-coordinate of 5 therefore will be on the line.

Example 2

What coordinates could we use to make a horizontal line?



We could use coordinates that have a y-coordinate of 4

For example, (0, 4), (1, 4), (2, 4), (3, 4) etc

Example 3

Which set of points below would all lie on this line?

Set A

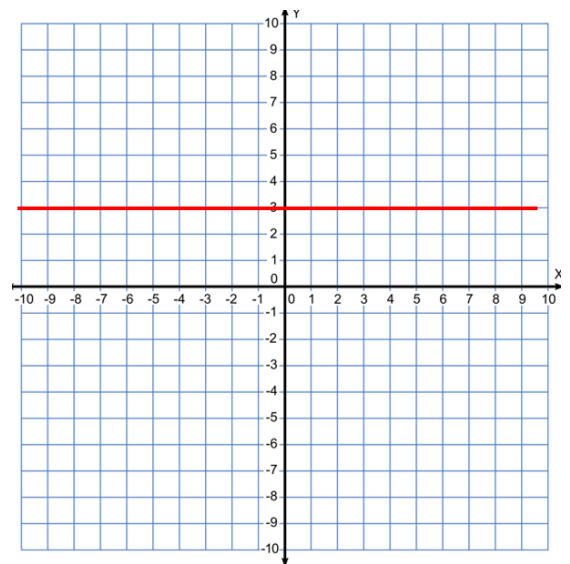
(3, 5) (3, 18) (3, 20)

Set B

(3, 6) (4, 7) (5, 8)

Set C

(21, 3) (6, 3) (50, 3)



The line passes through 3 on the y-axis and all points on the line have a y-coordinate of 3.

So all points in set C would lie on the line.

Example 4

A line passes through (4, 7) (4, 10) and (4, 12)

Can you describe what this line looks like?

All of the x-coordinates are 4 so this will be a vertical line passing through 4 on the x-axis

Example 5

Come up with a coordinate that would be on this line.

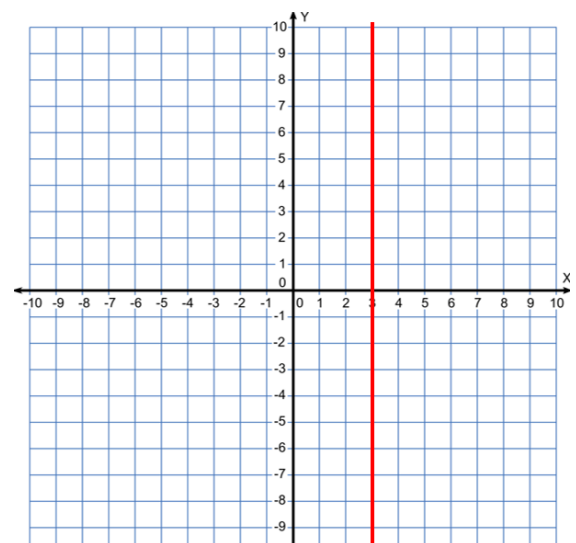
It does not have to be on the grid.

Be as creative as you can.

All of the coordinates on this line have a x-coordinate of 3.

So we can pick anything like (3, ?)

E.g. (3, 100)

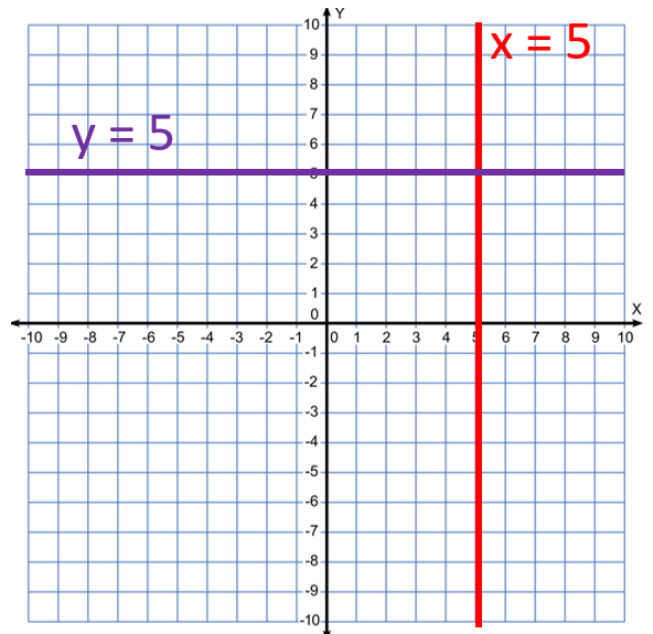


Equations of Lines

We can give each line a name that describes the coordinates of the points that make up the line.

For example, all points on the red line have an x-coordinate of 5. So, we can call this line $x = 5$. This is called the equation of the line.

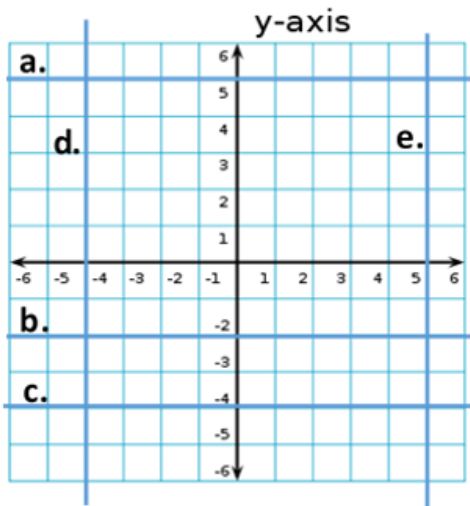
All points on the purple line have a y-coordinate of 5. So the equation of this line is $y = 5$.



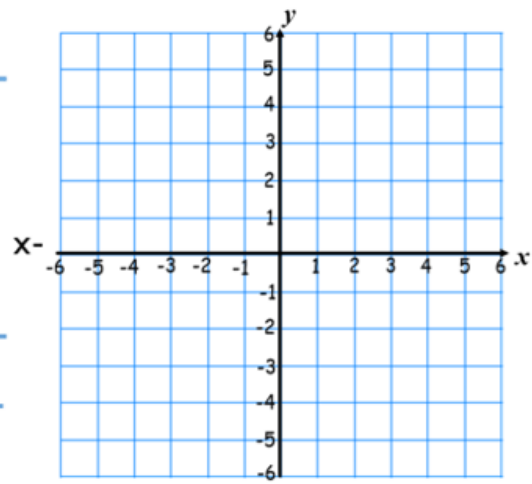
Example 6

1. Name the lines drawn on the axes:

- a)
- b)
- c)
- d)
- e)



2. Draw the lines on the axes, and label them:

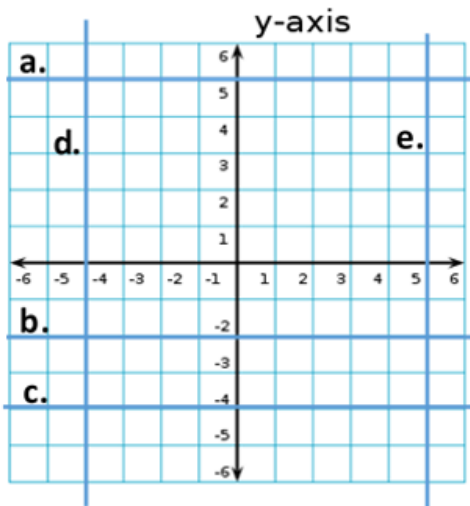


- a) $x = 3$
- b) $y = 0$
- c) $x = -3$
- d) $y = -4$
- e) $y = 2$
- f) $x = 0$

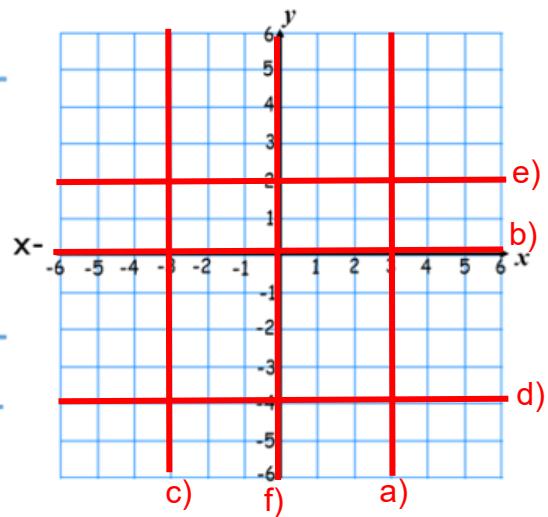
Answer

1. Name the lines drawn on the axes:

- a) $y = 5$
- b) $y = -2$
- c) $y = -4$
- d) $x = -4$
- e) $x = 5$



2. Draw the lines on the axes, and label them:



- a) $x = 3$
- b) $y = 0$
- c) $x = -3$
- d) $y = -4$
- e) $y = 2$
- f) $x = 0$

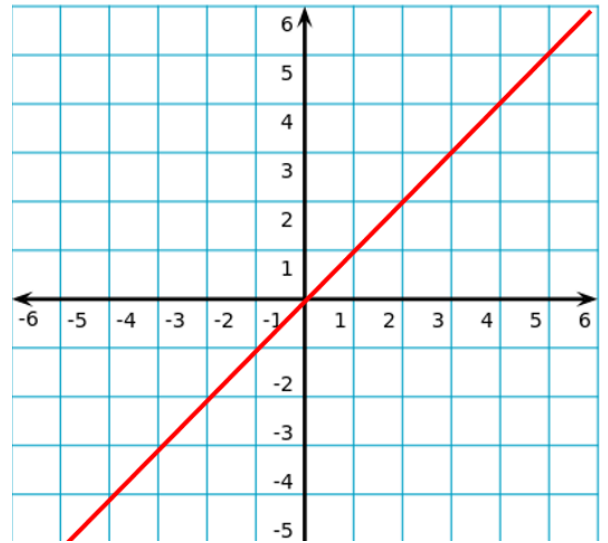
Example 7

- Write down four coordinates of points on this line
- Look at the x and y coordinates. What do you notice?
- What could the equation of this line be?

a) $(0, 0)$, $(1, 1)$, $(2, 2)$, $(3, 3)$ are on this line

b) The x and y coordinates are the same

c) The equation is $y = x$



Example 8

- Write down four coordinates of points on this line
- Look at the x and y coordinates. What do you notice?
- What could the equation of this line be?

a) $(1, -1)$, $(-1, 1)$, $(2, -2)$, $(-2, 2)$ are on this line

b) The x and y coordinates are the same value but opposite signs.

c) The equation is $y = -x$

