

# Recognise and use the line $y = x$

1 On the line  $y = x$ , the  $y$ -coordinate is equal to the  $x$ -coordinate.

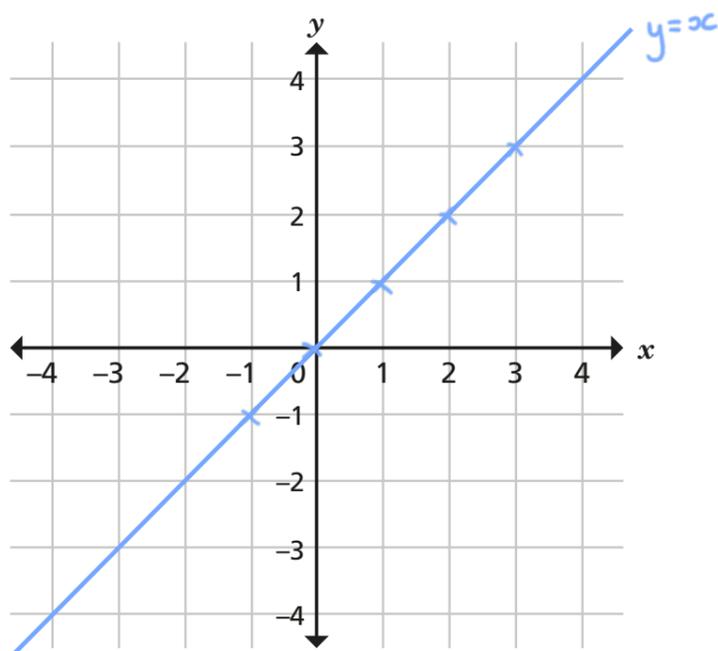
a) Complete the table of values for  $y = x$ .

$x$	-1	0	1	2	3
$y$	-1	0	1	2	3

b) Write the values in the table as coordinates.

$(-1, \boxed{-1})$ ,  $(0, 0)$ ,  $(\boxed{1}, 1)$ ,  $(2, \boxed{2})$ ,  $(\boxed{3}, 3)$

c) Plot the points.



d) Join the points to make the line  $y = x$ .

e) Is the point  $(3, 4)$  above or below the line  $y = x$ ? Above



2 Are these statements always true, sometimes true or never true.

Give a reason for your answer.

a) The line  $y = x$  is the same as the line  $x = y$ .

Always, they're the same equation.

b) The line  $y = x$  is at  $45^\circ$  to the  $x$ -axis.

Sometimes, it depends on the scale used on the axis.

c) The line  $y = x$  passes through the 4th quadrant.

Never, in the fourth quadrant  $x$  is positive and  $y$  is negative - this can't be true if  $y = x$ .

3 Tick the coordinates that lie on the line  $y = x$ .

$(5.6, 5.6)$

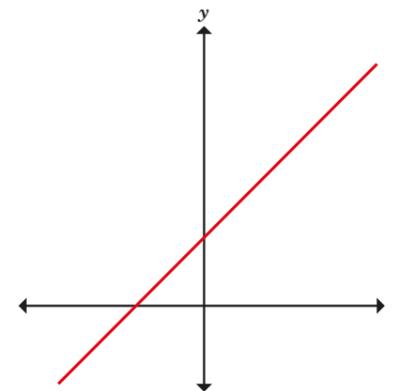
$(3a, a + 2a)$

$(120, 60^2)$

$(0.3, \frac{1}{3})$

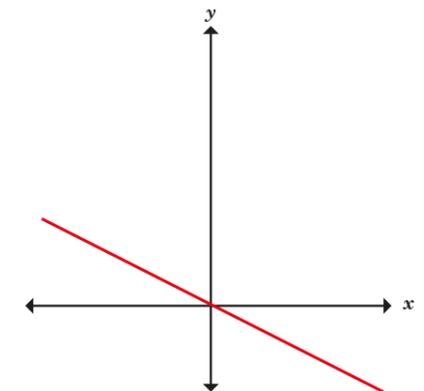
4 Give a reason why each graph is not the line  $y = x$ .

a)



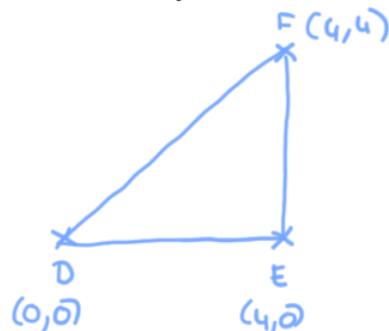
It doesn't go through the origin.

b)



It has a negative gradient.

- 5 The points D(0, 0), E(4, 0) and F(4, 4) join to make the triangle DEF.



- a) What is the equation of the line that passes through these points?

E and F  $x = 4$

D and E  $y = 0$

F and D  $y = x$

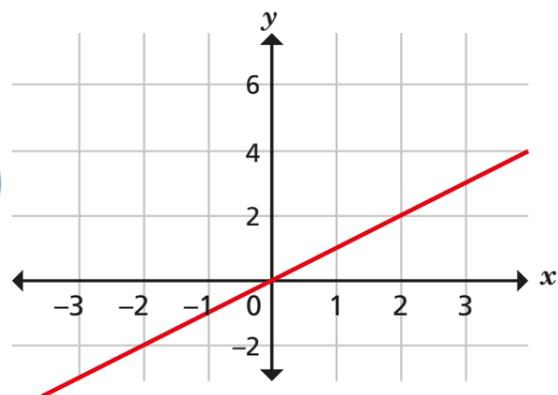
- b) Find the area of the enclosed triangle.

8 square units.

6



This graph of  $y = x$  has been plotted wrong because it is not steep enough.



Explain why Dexter is wrong.

He hasn't noticed the scale on the y-axis. In the coordinates for each point on the line segment the y value is equal to the x value so it is the line  $y = x$ .



- 7 Which of these is not the line  $y = x$ ?

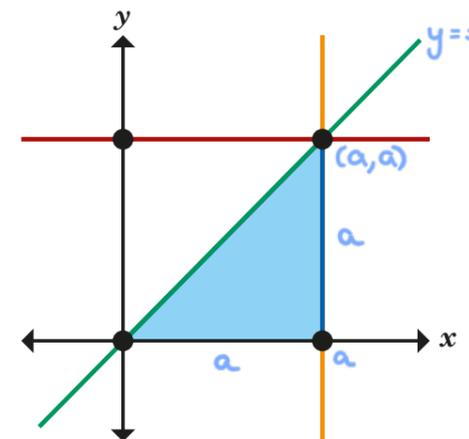
$y - x = 0$

$3x = 3y$

$x + y = 0$

$y = x + 0$

- 8 The lines  $y = x$  and  $x = a$  enclose a triangle with the  $x$ - and  $y$ -axes.



- a) Find the area of the triangle when  $a = 5$

12.5 square units.

- b) If the area of the triangle is 50, what is the value of  $a$ ?

$a = 10$

- c) Write a formula for the area of the triangle.

$A = \frac{1}{2}a^2$

