

Recognise and use the line $y = x$

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

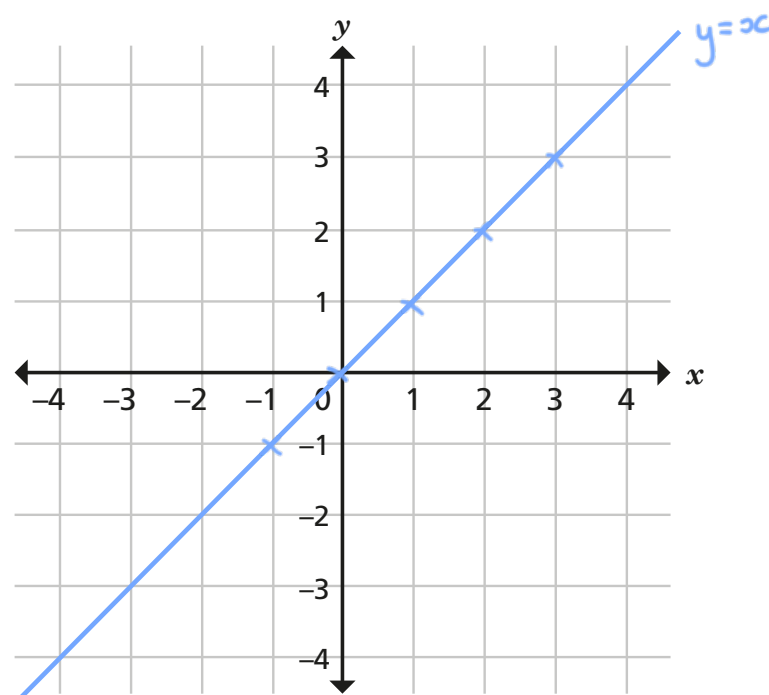
a) Complete the table of values for $y = x$.

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

b) Write the values in the table as coordinates.

$(-1, -1)$, $(0, 0)$, $(1, 1)$, $(2, 2)$, $(3, 3)$

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° 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 $y = x$.

$(5.6, 5.6)$ ☒

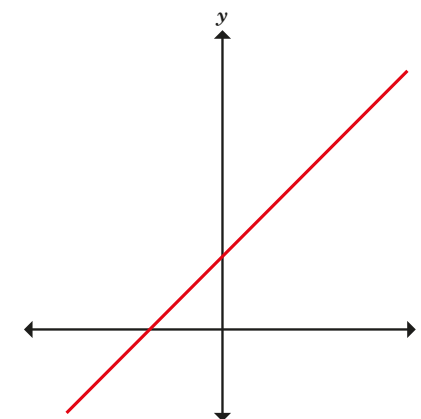
$(3a, a + 2a)$ ☒

$(120, 60^2)$ ☐

$(0.3, \frac{1}{3})$ ☐

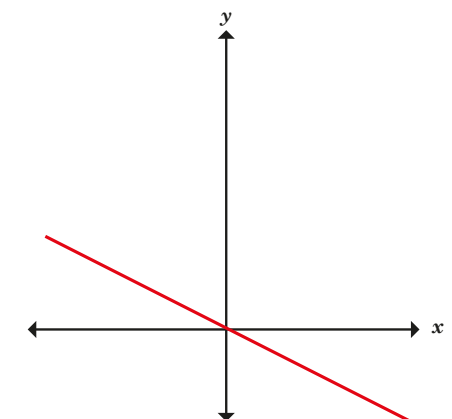
4 Give a reason why each graph is not the line $y = x$.

a)



It doesn't go through the origin.

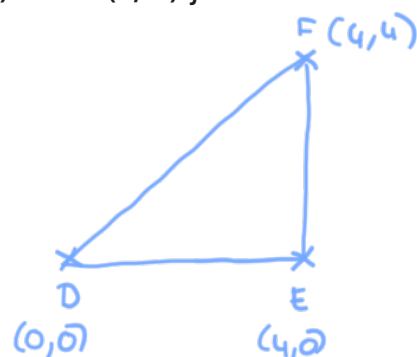
b)



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 $x = 4$

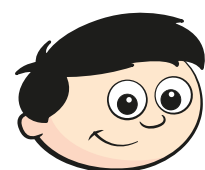
D and E $y = 0$

F and D $y = x$

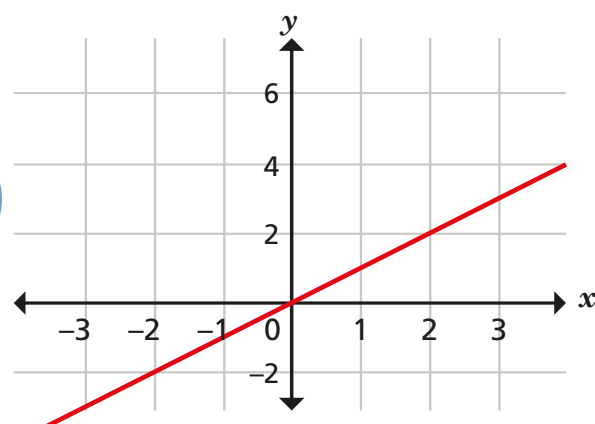
- b) Find the area of the enclosed triangle.

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 $y = x$?

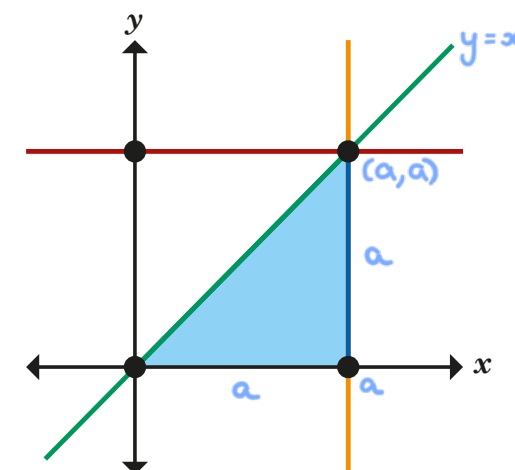
$y - x = 0$ ☐

$3x = 3y$ ☐

$x + y = 0$ ☒

$y = x + 0$ ☐

- 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.

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