THE LINE y = x

BUILDING BLOCKS

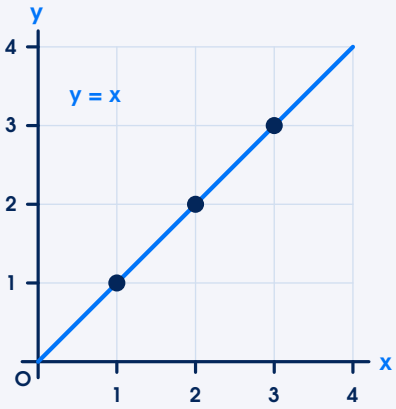
NAME _____ CLASS _____ DATE _____

KEY IDEA

Look at the points (1, 1), (2, 2) and (3, 3).

The x-coordinate and the y-coordinate are the SAME.

Join them with a ruler and you get a diagonal line.
It is called the line y = x.



1 Circle the points where the two numbers are the same.

(2, 2) (3, 1) (5, 5) (0, 0) (4, 6) (7, 7)

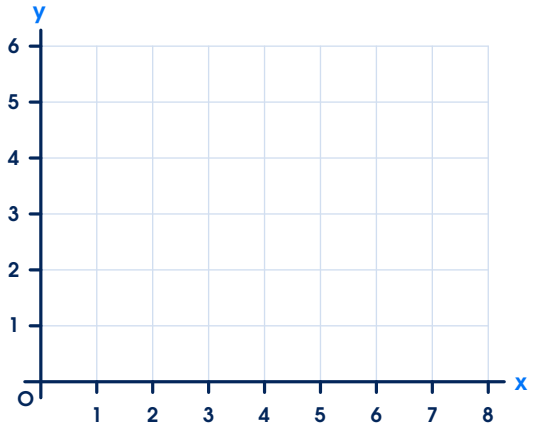
2 a) Complete the table of values.

x	0	1	2	3	4	5
y	0					

y is the same as x.

b) Plot the points on the grid.

c) Join them with a ruler.



3 Tick the lines that are diagonal.



4 Each point has the same x- and y-coordinate. Fill in the missing numbers.

(3 ,) (8 ,) (, 1) (, 10)

THE LINE y = x

SUPPORT

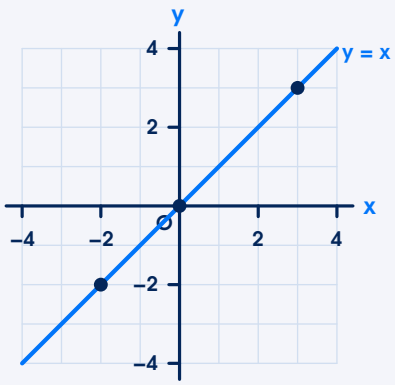
NAME _____ CLASS _____ DATE _____

KEY IDEA

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

(–2, –2), (0, 0) and (3, 3) are all on y = x.

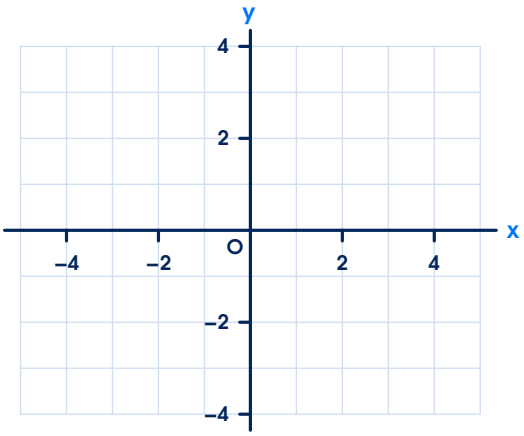
Draw the line across the whole grid.



1 a) Complete the table of values for y = x

x	–3	–2	–1	0	1	2	3
y	☐	☐	☐	☐	☐	☐	☐

b) Plot the points. Draw the line y = x across the whole grid.



2 Which points lie on the line y = x? Tick them.

(6, 6) ☐	**(–4, 4)** ☐	**(–9, –9)** ☐
(2.5, 2.5) ☐	**(1, –1)** ☐	**(0, 0)** ☐

3 a) Complete the table of values for y = –x

x	–3	–2	–1	0	1	2	3
y	3	☐	☐	☐	☐	☐	☐

b) Draw y = –x on your grid in question 1. Label both lines.

4 Fill in the missing numbers so that each point lies on y = x

(–7 , ☐) **(2.5 , ☐)** **(☐ , –10)** **(☐ , 0)**

THE LINE y = x

CORE

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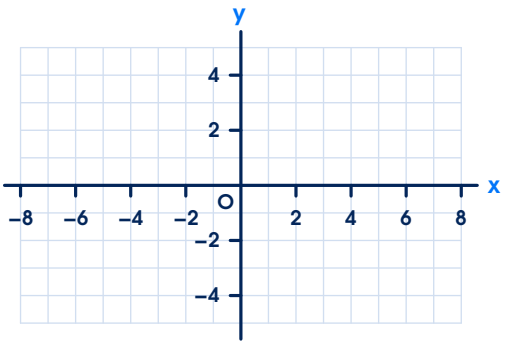
KEY IDEA

On y = x the coordinates are equal. On y = –x they are opposites. Both go through (0, 0).

FLUENCY

1 a) Draw and label the lines y = x and y = –x

Use a table of values if it helps. Draw each line across the whole grid.



b) The lines cross at (,)

2 Sort the points. Write the letters in the boxes. One point goes in two boxes.

A (4, 4) **B (–3, 3)** **C (5, –5)** **D (2, –3)** **E (–6, –6)** **F (0, 0)**

On y = x	On y = –x	On neither

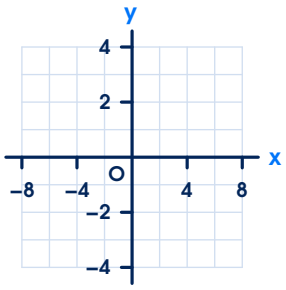
REASONING

3 On this grid the x-axis goes up in 2s and the y-axis goes up in 1s.

a) Draw y = x on the grid. Use the points (–4, –4), (0, 0) and (4, 4).

b) Is your line at 45° to the axes? Explain why.

.....



4 Where does the line y = x meet each of these lines?

a) x = 3 (,)

b) y = –2 (,)

c) y = –x (,)

THE LINE y = x

GREATER DEPTH

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REASONING

1 Is each statement always, sometimes or never true? Circle your answer.

If it is sometimes true, give an example of when it is true and when it is not.

a) The line y = x passes through the origin. ALWAYS SOMETIMES NEVER

b) If a > b, the point (a, b) lies above the line y = x. ALWAYS SOMETIMES NEVER

c) The line y = x is drawn at 45° to the x-axis. ALWAYS SOMETIMES NEVER

d) The lines y = x and x = y are the same line. ALWAYS SOMETIMES NEVER

PROBLEM SOLVING

2 The lines y = x, y = –x and x = 4 make a triangle.

a) Write the coordinates of the three corners.

(,) (,) (,) **b)** Area

3 Is each point above or below the line y = x? Circle your answer.

a) **(6, 2)** ABOVE BELOW **b)** **(–3, –1)** ABOVE BELOW

c) **(0, –4)** ABOVE BELOW **d)** **(–5, 2)** ABOVE BELOW

★ CHALLENGE FOR ALL

4 The points (0, 0) and (3, 3) are two corners of a square.

a) They are opposite corners. Find the other two corners.

b) They are the ends of one side. Find two possible corners.

THE LINE y = x

ANSWERS

BUILDING BLOCKS

1 (2, 2), (5, 5), (0, 0), (7, 7)
2 a) 0, 1, 2, 3, 4, 5 · b) and c) a diagonal line through (0, 0) and (5, 5)
3 Tick the 1st and 3rd lines
4 (3, 3) · (8, 8) · (1, 1) · (10, 10)

SUPPORT

1 a) –3, –2, –1, 0, 1, 2, 3 · b) straight line from (–4, –4) to (4, 4)
2 Tick (6, 6), (–9, –9), (2.5, 2.5) and (0, 0)
3 a) 3, 2, 1, 0, –1, –2, –3 · b) line from (–4, 4) to (4, –4)
4 (–7, –7) · (2.5, 2.5) · (–10, –10) · (0, 0)

CORE

1 a) y = x from (–5, –5) to (5, 5); y = –x from (–5, 5) to (5, –5) · b) (0, 0)
2 On y = x: A, E, F · on y = –x: B, C, F · neither: D
3 a) Line through (–4, –4), (0, 0), (4, 4) · b) No: it is steeper than 45°, because the scales are different (1 square across is 2 but 1 square up is 1).
4 a) (3, 3) · b) (–2, –2) · c) (0, 0)

GREATER DEPTH

1 a) Always · b) Never: if a > b the point is below the line, e.g. (5, 2) · c) Sometimes: only when both axes use the same scale · d) Always
2 a) (0, 0), (4, 4), (4, –4) · b) ½ × 8 × 4 = 16 square units
3 a) below · b) above · c) below · d) above
4 a) (0, 3) and (3, 0) · b) (–3, 3) and (0, 6), or (3, –3) and (6, 0)