Perpendicular lines

ANSWERS

1

Find the equation of the line with gradient **2** that passes through (3, 8).

$y = 2x + c$

$8 = 2 \times 3 + c$

$c = 2$

Answer $y = 2x + 2$

2

Find the equation of the line with gradient **4** that passes through (1, 9).

$y = 4x + c$

$9 = 4 \times 1 + c$

$c = 5$

Answer $y = 4x + 5$

3

Find the equation of the line with gradient **−3** that passes through (2, 1).

$y = -3x + c$

$1 = -3 \times 2 + c$

$c = 7$

Answer $y = -3x + 7$

4

Find the equation of the line perpendicular to $y = 2x + 1$ that passes through (4, 5).

$-1 \div 2 = -\frac{1}{2}$

$5 = -\frac{1}{2} \times 4 + c$

$c = 7$

Answer $y = -\frac{1}{2}x + 7$

5

Find the equation of the line perpendicular to $y = -3x + 4$ that passes through (3, 6).

$-1 \div (-3) = \frac{1}{3}$

$6 = \frac{1}{3} \times 3 + c$

$c = 5$

Answer $y = \frac{1}{3}x + 5$

6

Find the equation of the line perpendicular to $y = \frac{1}{4}x - 2$ that passes through (1, 3).

$-1 \div \frac{1}{4} = -4$

$3 = -4 \times 1 + c$

$c = 7$

Answer $y = -4x + 7$

7 *Notice the change!*

Find the equation of the line perpendicular to $y = 5 - x$ that passes through (2, 6).

$-1 \div (-1) = 1$

$6 = 1 \times 2 + c$

$c = 4$

Answer $y = x + 4$

8

Kim finds the line perpendicular to $y = 3x + 2$ that passes through (3, 4). She gets $y = 3x - 5$. Explain her mistake and find the right equation.

same gradient: parallel

$-1 \div 3 = -\frac{1}{3}$

$4 = -1 + c, \; c = 5$

Answer $y = -\frac{1}{3}x + 5$

Perpendicular lines *further practice*

ANSWERS

9

Find the equation of the line perpendicular to $y = 4x - 3$ that passes through (8, 1).

$-1 \div 4 = -\frac{1}{4}$

$1 = -2 + c, \; c = 3$

Answer $y = -\frac{1}{4}x + 3$

10

Find the equation of the line perpendicular to $y = -2x + 5$ that passes through (−2, 4).

$-1 \div (-2) = \frac{1}{2}$

$4 = -1 + c, \; c = 5$

Answer $y = \frac{1}{2}x + 5$

11

Find the equation of the line perpendicular to $y = 3x + 1$ that crosses the y axis at (0, 4).

$-1 \div 3 = -\frac{1}{3}$

(0, 4) is on the y axis: c = 4

Answer $y = -\frac{1}{3}x + 4$

12

Find the equation of the line perpendicular to $y = \frac{2}{3}x + 2$ that passes through (2, 1).

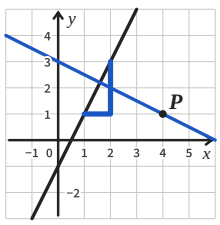
$-1 \div \frac{2}{3} = -\frac{3}{2}$

$1 = -3 + c, \; c = 4$

Answer $y = -\frac{3}{2}x + 4$

13

Find the equation of the line through P perpendicular to the line on the grid.



the line has gradient 2; $-1 \div 2 = -\frac{1}{2}$

$1 = -2 + c, \; c = 3$

Answer $y = -\frac{1}{2}x + 3$

14

On a plan, a footpath follows the line $y = 2x + 1$. A new path meets it at right angles at the point (2, 5).
Find the equation of the new path.

$-1 \div 2 = -\frac{1}{2}$

$5 = -1 + c, \; c = 6$

Answer $y = -\frac{1}{2}x + 6$

15

Line L is perpendicular to $y = x + 2$ and passes through (1, 3). Where does L cross the x axis?

L: $y = -x + 4$

$0 = -x + 4$, so $x = 4$

Answer *(4, 0)*

16

Is the line through (0, 3) and (4, 1) perpendicular to $y = 2x + 7$?
Show how you know.

gradient $= -2 \div 4 = -\frac{1}{2}$

$2 \times -\frac{1}{2} = -1$

Answer *Yes*