

Perpendicular Lines *stretch*

ANSWERS

1



Find the equation of the line through (2, 5) that is perpendicular to the line through (-1, 0) and (3, 2).

gradient $\frac{2}{4}$, so perpendicular -2

$$5 = -2 \times 2 + C, C = 9$$

Answer $y = -2x + 9$

2



Show that the lines $2y = x + 6$ and $y = 5 - 2x$ are perpendicular, and find where they meet.

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

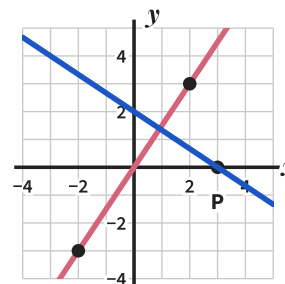
$$\frac{1}{2}x + 3 = 5 - 2x: x = 0.8, y = 3.4$$

Answer $(0.8, 3.4)$

3



Find the equation of the line through P that is perpendicular to the line shown.



$$\text{gradient } \frac{3}{2}, \text{ so } -\frac{2}{3}; 0 = -2 + C$$

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

4



A road runs along $y = \frac{1}{2}x + 1$.

A footpath leaves the road at right angles where $x = 4$. Where does the footpath cross the x axis?

$$\text{from } (4, 3): y = -2x + 11$$

$$0 = -2x + 11, x = 5.5$$

Answer $(5.5, 0)$

5



Aisha says a line perpendicular to $y = 3x - 1$ has gradient -3 . Explain her mistake and give the right gradient.

she changed the sign but did not flip it

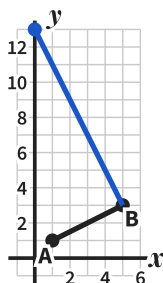
$$3 \times -3 = -9, \text{ not } -1$$

Answer $-\frac{1}{3}$

6



A is (1, 1) and B is (5, 3). C is on the y axis and angle ABC is 90° . Find the coordinates of C.



$$BC: \text{gradient } -2; 3 = -10 + C, C = 13$$

Answer $(0, 13)$

7



Three corners of a rectangle ABCD are A(1, 2), B(3, 6) and C(7, 4). Show that AB and BC are perpendicular, and find D.

$$AB: 2, BC: -\frac{1}{2}; 2 \times -\frac{1}{2} = -1$$

$$D = A + (C - B) = (5, 0)$$

Answer $D(5, 0)$

8



Explain why no line perpendicular to $y = 4$ can be written in the form $y = mx + c$.

$$y = 4 \text{ is horizontal, gradient } 0$$

$$\text{a vertical line has no gradient } m$$

Reason $\text{It is vertical: } x = k$