Parallel and Perpendicular Graphs GREEN

1. Work out whether these pairs of lines are parallel, perpendicular or neither:

a) $y = 4x + 2$ and $y = -\frac{1}{4}x - 7$

b) $y = \frac{2}{3}x - 1$ and $y = \frac{2}{3}x - 11$

c) $y = \frac{1}{5}x + 9$ and $y = 5x + 9$

d) $y = 5x - 3$ and $5x - y + 4 = 0$

e) $3x + 2y - 12 = 0$ and $2x + 3y - 6 = 0$

f) $5x - y + 2 = 0$ and $2x + 10y - 4 = 0$

2. A line is perpendicular to the line $y = 6x - 9$ and passes through the point $(0, 1)$. Find an equation of the line.

3. A line is perpendicular to the line $3x + 8y - 11 = 0$ and passes through the point $(0, -8)$. Find an equation of the line.

4. Find an equation of the line that passes through the point $(6, -2)$ and is perpendicular to the line $y = 3x + 5$.

5. Find an equation of the line that passes through the point $(5, -5)$ and is perpendicular to the line $y = \frac{2}{3}x + 5$. Write your answer in the form $ax + by + c = 0$, where a, b and c are integers.

6. The line l_1 passes through the points $(-3, 0)$ and $(3, -2)$ and the line l_2 passes through the points $(1, 8)$ and $(-1, 2)$. Show that the lines l_1 and l_2 are perpendicular.

7. The vertices of a quadrilateral $ABCD$ have coordinates $A(-1, 5)$, $B(7, 1)$, $C(5, -3)$ and $D(-3, 1)$. Show that the quadrilateral is a rectangle.

8. A line l_1 has equation $5x + 11y - 7 = 0$ and crosses the x-axis at A. The line l_2 is perpendicular to l_1 and passes through A. Find the equation of the line l_2. Write your answer in the form $ax + by + c = 0$.

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You will need to rearrange these so they're in the form y = mx + c

d) $y = 5x - 3$ and $5x - y + 4 = 0$

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Calculate the perpendicular gradient then substitute into $y - y_1 = m(x - x_1)$

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Calculate the gradients then work out if their product is -1

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Sides of a rectangle are perpendicular

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Start by calculating A

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$y = -\frac{1}{4}x - 7$

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

b) $y = \frac{2}{3}x - 1$
$y = \frac{2}{3}x - 11$

Same gradient!

c) $y = \frac{1}{5}x + 9$
$y = 5x + 9$

$\frac{1}{5} \times 5 =$

You will need to rearrange these so they're in the form y = mx + c

d) $y = 5x - 3$
$5x - y + 4 = 0$

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$-1 \div 6 = -\frac{1}{6}$

$y - 1 = -\frac{1}{6}(x - 0)$

$y =$

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$m_1 = \frac{-2 - 0}{3 + 3} =$ $\quad$ $m_2 = \frac{2 - 8}{-1 - 1} =$

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