

Perpendicular Lines

1. From the following set of equations, which pairs would you expect to be perpendicular?

A: $y = 2x + 6$	B: $y = \frac{2}{3}x + 3$	C: $y = -\frac{1}{2}x + 1$
D: $y = \frac{1}{2}x + 5$	E: $y = -2x + 4$	F: $y = -\frac{1}{2}x + 2$

A and **F**

A and **C**

D and **E**

2. The equations of 5 lines are listed below:

A $y = 6x - 3$

B $y = 2x - 5$

C $y = 2x + 2$

D $y = 6x - 5$

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

d) Which line is parallel to A? **D**

e) Which line is parallel to C? **B**

f) Which line is perpendicular to B and C? **E**

3. Write down the equations of 2 lines which are parallel to $y = -4x + 3$

2 lines where $y = -4x + c$

eg $y = -4x - 2$ and $y = -4x + 1$

4. Write down the equations of 2 lines which are perpendicular to $y = 3x +$

2 lines where $y = -\frac{1}{3}x + c$

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

5. Determine whether the following pairs of lines are perpendicular or not. You will need to rearrange some of the equations first so they are in the form $y = mx + c$.

	Line A	Line B	Perpendicular?
1	$y = -4x + 3$	$4y + x = -1$	N
2	$y = -\frac{2}{3}x + 4$	$3x + 2y = 1$	N
3	$2x - 5y = -3$	$5x + 2y = 6$	Y
4	$x - 3y = 9$	$8y + 24x = 16$	Y
5	$x + y = 6$	$4y - 4x = 12$	Y
6	$y = -x + 8$	$x - y = -1$	Y

6. Find equation of the line through $(10, 3)$ which is perpendicular to the line $y = -5x + \dots$

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

7. Find equation of the line through $(8, 5)$ which is perpendicular to the line $y = \frac{1}{4}x + 1$.

$$y = -4x + 37$$

8. Find equation of the line through $(4, 10)$ which is perpendicular to the line $y = -\frac{2}{3}x + 2$.

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

9. Find equation of the line through $(8, -2)$ which is perpendicular to the line $4x - 2y = 6$.

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

10. Find equation of the line through $(-2, -3)$ which is perpendicular to the line $2y + 4x = 8$.

$$y = \frac{x}{2} - 2$$

Extension

C. Find the equation of the line which passes through the intersection point of the lines $y = x + 3$ and $y = 11 - 3x$ and is parallel to $x + y = 2$

Intersection: $(2, 5)$

Line: $y = -x + 7$

D. Find the equation of the perpendicular bisector of the line joining the points $(4, 3)$ and $(8, 11)$

Midpoint: $(6, 7)$

Gradient of line joining $(4, 3)$ and $(8, 11) = \frac{11-3}{8-4} = \frac{8}{4} = 2$

Equation of perpendicular bisector: $y = -\frac{x}{2} + 10$