# Perpendicular and parallel lines

Sunday, 4 February 2018 5:39 pm

| Progress quiz | Exercise 1I Page 52 | 3 | — |
|---|---|---|---|
| **1I Perpendicular and parallel lines** | | 4-5(½) | 4-5(½) |
| Let's start: *Gradient connection* | | 6-7(½), 8 | 6-7(½), 8, 9 |
| Key ideas | | 10, 11 | 11, 12 |
| Examples 25, 26 | | — | 13-15 |

**Key questions**

- What is a parallel line?
- What is a perpendicular line?
- How do I know if lines are parallel?
- How do I find a perpendicular gradient?
- How do I find the equation of a parallel line?
- How do I find the equation of a perpendicular line?

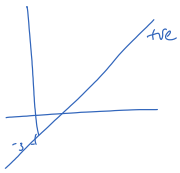
$y = mx + c$

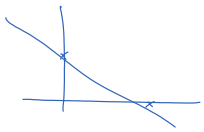
Gradient/Intercept

$y = 2x - 3$

Intercept Form

$2x + 3y = 6$



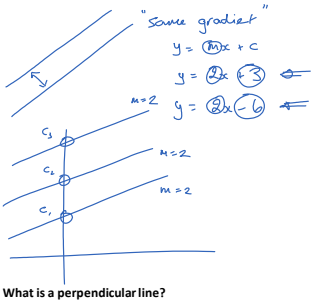



$y = mx + c$

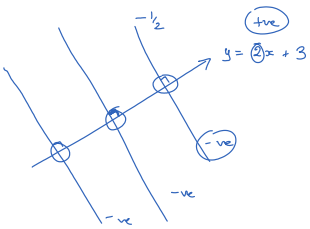
1

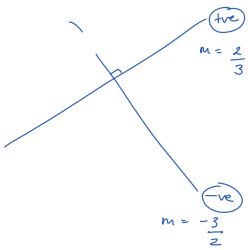
0

**What is a parallel line?**




**What is a perpendicular line?**




$m = \frac{1}{5}$ & $m = \frac{-5}{1} = -5$

$m = \frac{6}{7}$ & $m = -\frac{7}{6}$

$m = -3$ & $m = \frac{1}{3}$

÷ k.c.f

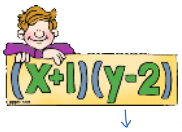
$\frac{1}{2} \div \frac{1}{3} = \frac{1}{2} \times \frac{3}{1}$

F.(c.f.s)

$+\frac{1}{5}) \quad -\frac{5}{1}$

$+\frac{6}{7}) \rightarrow -\frac{7}{6}$

**How do I know if a line is parallel or perpendicular??**




$y = mx + c$

$y = 3x - 6$ parallel

$y = 3x + 10$ perp

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

$y = \frac{1}{3}x + 7$ TRICK!

$m = 3$

$m = -\frac{1}{3}$ perp.

**Note**: Be careful to make sure lines are written in gradient/intercept form and not intercept form. It makes life MUCH easier!

$2x + 3y = 6$ (−2x)

$3y = -2x + 6$ ÷3

$y = -\frac{2}{3}x + \frac{6}{3}$

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

$m = -\frac{2}{3}$

**Is there a link between parallel and perpendicular lines?**

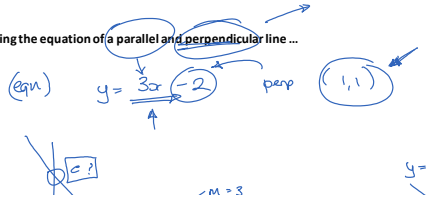
$m_1 \times m_2 = -1$

$m = \frac{1}{2}$ & $m = -\frac{2}{1}$

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

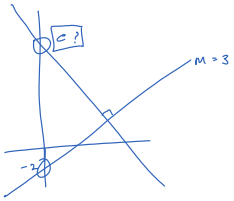
$m = \frac{1}{3}$ & $m_2 = \frac{-3}{1} = -3$

**Finding the equation of a parallel and perpendicular line ...**




$y = mx + c$ m

$y - y_1 = m(x - x_1)$




m

$y = mx + c$

Co-ord.

$y - y_1 = m(x - x_1)$

$m = 3$ $\quad$ ∴ $m = -\frac{1}{3}$

$y = mx + c \qquad (1, 1)$

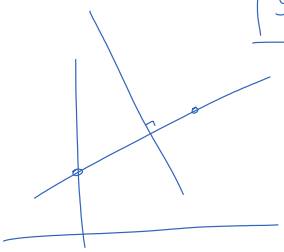
$1 = -\frac{1}{3} \cdot 1 + c$

$1 = -\frac{1}{3} + c \qquad + \frac{1}{3}$

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

$1\frac{1}{3} = c = \frac{4}{3}$

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



$y = mx + c$

c

$y = \ldots\ldots$