

Equation of a Straight Line

Exercise 1

Find the gradients of line segments between the following pairs of points

1) $(5, 8)$ and $(10, 17)$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{17 - 8}{10 - 5} = \frac{9}{5}$$

2) $(3, 4)$ and $(6, 10)$

$$m = \frac{10 - 4}{6 - 3} = \frac{6}{3} = 2$$

3) $(7, 1)$ and $(11, -7)$

$$m = \frac{-7 - 1}{11 - 7} = \frac{-8}{4} = -2$$

4) $(-3, 5)$ and $(4, -1)$

$$m = \frac{-1 - 5}{4 - (-3)} = \frac{-6}{7}$$

5) $(-2, -3)$ and $(-1, -6)$

$$m = \frac{-6 - (-3)}{-1 - (-2)} = \frac{-6 + 3}{-1 + 2} = \frac{-3}{1} = -3$$

Exercise 2

Find the equations of lines with given gradients passing through given points

1) $m = 3$ through $(4, 10)$

$$y = 3x + c \quad \text{sub}(4, 10) \quad 10 = 3(4) + c$$
$$10 = 12 + c$$
$$10 - 12 = c$$
$$-2 = c$$

$$\underline{y = 3x - 2}$$

2) $m = 4$ point $(0, 0)$

$$y = 4x + c \quad \text{sub}(0, 0) \quad 0 = 4(0) + c$$
$$0 = c$$

$$\underline{y = 4x}$$

3) $m = -\frac{1}{2}$ point $(-4, 1)$

$$y = -\frac{1}{2}x + c \quad \text{sub}(-4, 1) \quad 1 = -\frac{1}{2}(-4) + c$$
$$1 = 2 + c$$
$$1 - 2 = c$$
$$-1 = c$$

$$\underline{y = -\frac{1}{2}x - 1}$$

4) $m = -1$ point $(5, 6)$

$$y = -x + c \quad \text{sub}(5, 6) \quad 6 = -5 + c$$
$$6 + 5 = c$$
$$11 = c$$

$$\underline{y = -x + 11}$$