Exercise 5C

1 a) $m = 2$

$(x_1, y_1) = (2, 5)$

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

$y - 5 = 2(x - 2)$

$y - 5 = 2x - 4$

$y = 2x + 1$

2 a) $\overset{x_1\ y_1}{(2, 4)}$ $\overset{x_2\ y_2}{(3, 8)}$

$$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

$$\frac{y - 4}{8 - 4} = \frac{x - 2}{3 - 2}$$

$$\frac{y - 4}{4} = \frac{x - 2}{1}$$

$y - 4 = 4(x - 2)$

$y - 4 = 4x - 8$

$y = 4x - 4$

$$m = \frac{y_2 - y_1}{x_2 - x_1}$$

$$= \frac{8 - 4}{3 - 2} = \frac{4}{1} = 4$$

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

$y - 4 = 4(x - 2)$

$y - 4 = 4x - 8$

$y = 4x - 4$

2 h) $(-4, -1)$ $(-3, -9)$

$$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

$$\frac{y - -1}{-9 - -1} = \frac{x - -4}{-3 - -4}$$

$$\frac{y + 1}{-8} = \frac{x + 4}{1}$$

$$m = \frac{-9 - -1}{-3 - -4} = \frac{-8}{1}$$

$= -8$

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

$y - -9 = -8(x - -3)$

$y + 9 = -8(x + 3)$

$y + 9 = -8x - 24$

$y = -8x - 24 - 9$

$y = -8x - 33$

$$y+1 = -8(x+4)$$
$$y+1 = -8x-32$$
$$y = -8x-33$$

Exercise 1f, 2g

1f) $m = -\frac{2}{3}$ $(x_1, y_1) = (-6, -1)$

$$y - y_1 = m(x - x_1)$$
$$y - -1 = -\frac{2}{3}(x - -6)$$
$$y+1 = -\frac{2}{3}(x+6)$$
$$y+1 = -\frac{2}{3}x - 4$$
$$y = -\frac{2}{3}x - 5$$

2g $(-1, -5)$ $(-3, 3)$

$$m = \frac{3 - -5}{-3 - -1} = \frac{8}{-2} = -4$$
$$y - y_1 = m(x - x_1)$$
$$y - -5 = -4(x - -1)$$
$$y+5 = -4(x+1)$$
$$y+5 = -4x - 4$$
$$y = -4x - 9$$

Exercise 5D

7) $(3, \frac{5}{2})$ $(-\frac{3}{2}, 4)$

$$m = \frac{4 - \frac{5}{2}}{-\frac{3}{2} - 3} = \frac{\frac{3}{2}}{-\frac{9}{2}}$$
$$= -\frac{3}{2} \times \frac{2}{9} = -\frac{1}{3}$$

$$y - y_1 = m(x - x_1)$$
$$y - \frac{5}{2} = -\frac{1}{3}(x - 3)$$
$$y - \frac{5}{2} = -\frac{1}{3}x + 1$$
$$y = -\frac{1}{3}x + \frac{7}{2}$$

At J $x = 0$

$$y = 0 + \frac{7}{2} = \frac{7}{2}$$

$J(0, \frac{7}{2})$

9) $y = 4x - 10$ ①

$y = x - 1$ ②

Sub for y in ①

$x - 1 = 4x - 10$

$+10 - 1 = 4x - x$

$9 = 3x$

$3 = x$

Sub in ②

$y = 3 - 1 = 2$

$\therefore T(3, 2)$

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

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

$y - 2 = -\frac{2}{3}(x - 3)$

$3y - 6 = -2(x - 3)$

$3y - 6 = -2x + 6$

$2x + 3y - 12 = 0$

11) $y = -2x + 6$

On x-axis $y = 0$

$0 = -2x + 6$

$2x = 6$

$x = 3$

$\therefore P(3, 0)$

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

On y-axis $x = 0$

$y = \frac{3}{2}(0) - 4$

$y = -4$

$\therefore Q(0, -4)$

$$\frac{y - y_1}{y_2 - y_1} = \frac{x - x_1}{x_2 - x_1}$$

$$\frac{y - 0}{-4 - 0} = \frac{x - 3}{0 - 3}$$

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

$-3y = -4(x - 3)$

$y = \frac{4}{3}(x - 3)$

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

15) $y = x - 5$ ①

$y = 3x - 13$ ②

② - ① $0 = 2x - 8$

$8 = 2x$

$4 = x$

Sub for x in ①

$y = 4 - 5$

$y = -1$

$\therefore S(4, -1)$

Given $T(-4, 2)$

$$m = \frac{-1-2}{4--4} = \frac{-3}{8}$$

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

$y - -1 = -\frac{3}{8}(x - 4)$

$y + 1 = -\frac{3}{8}x + \frac{3}{2}$

$y = -\frac{3}{8}x + \frac{1}{2}$

Hwk Exercise 5D 8, 10, 12, 14, 16