

EQUATION OF A LINE APPLICATION

1. a) t, h
 $(12, 41)$ and $(22, 71)$

$$\text{Gradient} = \frac{71-41}{22-12}$$

$$= \frac{30}{10} = 3$$

$$\frac{3}{1} = \frac{h-41}{t-12}$$

$$h-41 = 3t - 36 + 41$$

$$h = 3t + 5$$

b) current height at $t=0$

$$h = 3(0) + 5'$$

$$= \underline{\underline{5m}}$$

c) at 45min

$$h = 3(45) + 5'$$

$$= 135 + 5'$$

$$= \underline{\underline{140min}}$$

d) at 176 m

$$176 = 3t + 5'$$

$$\begin{array}{r} 57 \\ 171 \\ \hline 5 \end{array} = 3t$$

$$\frac{57}{3} = t$$

$$t = \underline{\underline{57min}}$$

2. a) t, W
 $(2, 10.85), (5, 12.95)$

$$\text{Gradient} = \frac{12.95 - 10.85}{5 - 2}$$

$$= \frac{2.10}{3} = 0.7$$

Equation

$$\frac{0.7}{1} = \frac{W - 10.85}{t - 2}$$

$$W - 10.85 = 0.7t - 1.4 + 10.85$$

$$W = 0.7t + 9.45'$$

b) current rate pay, $t=0$

$$W = 0.7(0) + 9.45'$$

$$= \underline{\underline{\$9.45'}}$$

c) in 4 years

$$W = 0.7(4) + 9.45'$$

$$= 2.8 + 9.45$$

$$= \underline{\underline{\$12.25}}$$

3. a) t, C
 $(3, 13.2), (8, 21.45)$

$$\text{gradient} = \frac{21.45 - 13.2}{8 - 3}$$

$$= \frac{8.25}{5}$$

$$= 1.65$$

Equation

$$\frac{1.65}{1} = \frac{C - 13.2}{t - 3}$$

$$C - 13.2 = 1.65t - 4.95$$

$$C = 1.65t + 8.25$$

b) Plain pizza, topping $t = 0$
 $C = 1.65(0) + 8.25$
 $= \underline{\underline{\$ 8.25}}$

c) on \$26.40
 $26.4 = 1.65t + 8.25$

$$\frac{18.15}{1.65} = \frac{1.65t}{1.65}$$

$$t = \underline{\underline{11}}$$

4. (3, 4) and (-3, 1)

a) Gradient = $\frac{-4-1}{3-(-3)}$
 $= -\frac{5}{6}$

Equation

$$-\frac{5}{6} = \frac{y-1}{x+3}$$

$$6y - 6 = -5x - 15 + 6$$

$$\frac{6y}{6} = \frac{-5x + 9}{6}$$

$$y = -\frac{5}{6}x - \frac{3}{2}$$

b) (-1, 5) and (6, -14)

Gradient = $\frac{-14-5}{6-(-1)}$
 $= -\frac{19}{7}$

Equation

$$-\frac{19}{7} = \frac{y-5}{x+1}$$

$$7y - 35 = -19x - 19$$

$$7y = -19x + 16$$

$$y = -\frac{19}{7}x + \frac{16}{7}$$

5. $3x - y - 9 = 0$

$$3x = y + 9$$

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

x-Intercept = 3

Point (3, 0)

$$x - 2y - 8 = 0$$

$$2y = x - 8$$

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

y-Intercept = -4

Point (0, -4)

Line through (0, -4) and (3, 0)

$$\text{Gradient} = \frac{0-(-4)}{3-0} = +\frac{4}{3}$$

Equation of the line

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

$$6. \text{ Slope} = \frac{1}{2}$$

$$\begin{array}{r} 2x - y = 7 \\ -3x + y = 13 \\ \hline \end{array}$$

$$5x = 20$$

$$x = 4$$

$$2(4) - y = 7$$

$$8 - y = 7$$

$$y = 1$$

Point of Intersection

$$(4, 1)$$

Equation

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

$$2y - 2 = x - 4$$

$$2y = x - 2$$

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