1 a) 3

b) $2,67$ or $2\frac{2}{3}$

c) $1\frac{1}{5}$ or $1,2$

2 a) $1\frac{1}{3}$ or $1,33$

b) 11

c $0,08$

3 a) $2:3:5$

b) $\frac{5}{10} \times 150$

75 sweets

4

150

$3km = 3000m$
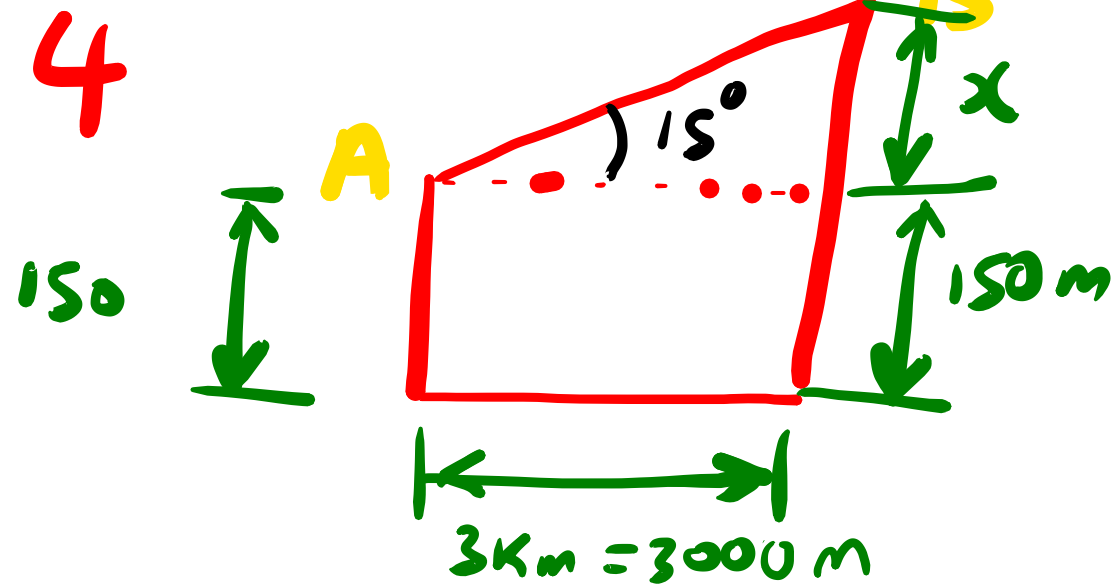
$\tan 15 = \dfrac{x}{3000}$

$x = 3000 \times \tan 5$

$\quad = 3000 \times 0,0875$

$\quad = 262,5$

$\therefore$ the height $= 262,5 + 150$

$\quad = 412,5 \, m$

5. a) $P\hat{Q}R = 30°$

b) $30 + 300 + x + x = 360$

$\quad 2x = 30$

$\quad x = 15$

$\dfrac{60}{2} = 30$

$\dfrac{30}{2} = 15$

$\therefore x = 15°$

6. $\quad x = 3 - 3y \quad --(1)$

$2y = x - 8 \quad \cdot -(2)$

$2y = 3 - 3y - 8$

$\dfrac{5y}{5} = \dfrac{-5}{5}$

$$y = -1$$

$$x = 3 - 3(-1)$$

$$= 3 + 3$$

$$= 6$$

$$x = 6 \text{ and } y = -1$$

7 Area of wall

$$6 \times 5 = 30 \, m^2$$

Area of window = 1,5

$$\begin{array}{r} \times 1,2 \\ \hline 150 \\ 30 \\ \hline 1,80 \end{array}$$

$$\therefore \quad 30 - 1,8$$

$$= 28,2 \, m^2$$

8 a (i) $\{1; 8\}$

(ii) $\{1; 8\}$

b) $B \subset A$ or $A \supset B$

9 a) $7,32 \times 10^1$

b) $400 - 188 = 212$

$$2,12 \times 10^2$$

Alternatively

$10^2 (4 - 1.88)$

$10^2 (2.12)$

2.12×10^2

10 a) (i) $10\,000

(ii) 3cm

b (i)

2	432
2	216
2	108
2	54
3	27
3	9
3	3
	1

$\therefore 2^4 \times 3^3$

(ii) 3

11 (a) $15 \times 80 = 1200$

profit $= SP - BP$

$\therefore$ profit $= 1200 - 640$

$= \$560$

b) $\quad I = \dfrac{PRT}{100}$

$240 = \dfrac{4000 \times 3 \times T}{100}$

$\dfrac{120T}{120} = \dfrac{240}{120}$

$T = 2 \text{ years}$

12 a) $5 \cdot 45 \text{ am}$

b(i)
$\begin{array}{r} 0725 \\ -\ 0715 \\ \hline 10 \end{array}$

$\therefore \underline{10 \text{ minutes}}$

(ii)
$\begin{array}{r} 0\overset{6}{7}\overset{6}{2}\overset{0}{5} \\ -\ 0545 \\ \hline 1 \text{hr } 40 \text{min} \end{array}$

$1 \frac{2}{3} \text{ hr}$

Average Speed = $\dfrac{\text{total distance}}{\text{total time}}$

$= S \div \dfrac{S}{3}$

$= 3 \, km/hr$

13 a) $S\hat{Q}T = 30°$

b) $T\hat{Q}P = 50°$

c) $S\hat{Q}P = 180 - (30 + 50)$

$= 100$

$P\hat{S}Q = S\hat{P}Q = \dfrac{100}{2} = 50°$

$\therefore P\hat{T}Q = 80°$

14 a)

3/5 P
2/3 P
1/3 F
2/5 F
2/3 P
1/3 F
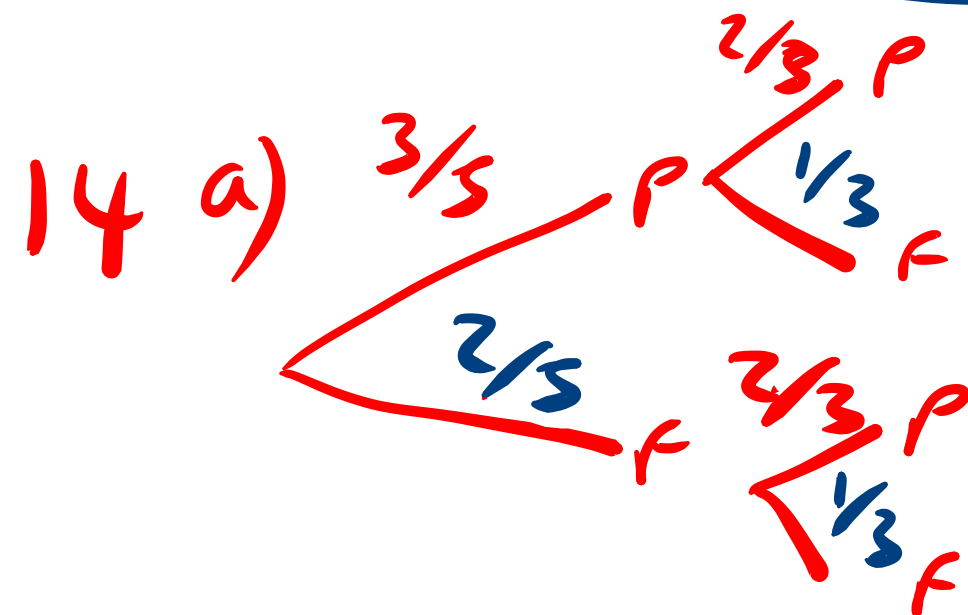
b) $P(\text{pass, fail}) + P(\text{fail, pass})$

$\left(\dfrac{3}{5} \times \dfrac{1}{3}\right) + \left(\dfrac{2}{5} \times \dfrac{2}{3}\right)$

$= \dfrac{7}{15}$

15 a) (i) $2(2x-y)$

(ii) $(2x-y)(2x+y)$

b) $2(2x-y)(2x+y)$

16 a) direct variation

b) $D = kL$

$7.5 = k \times 0.5$

$k = 15$

$\therefore \underline{D = 15L}$

c) $\dfrac{480}{15} = \dfrac{15L}{15}$

$\underline{L = 32 \text{ litres}}$

17 a) $360 - 240$

120

$180 - 120 = 60$

$\therefore N\ 60°E$

Alternatively

$240 - 180$

60

$\therefore N 60° E$

b) $SF^2 = 5^2 + 8^2 - 2 \times 5 \times 8 \cos 120$

$= 25 + 64 - 80 \cos 120$

$= \sqrt{89 - 80 \cos 120}$

$= \sqrt{89 - 80(-0,5)}$

$= \sqrt{129}$

18 a) $6 - 3y = 9$

$\dfrac{3y}{3} = \dfrac{-3}{3}$

$y = -1$

b) $\begin{pmatrix} 2 \times 1 & 2 \times -3 \\ 3 \times 1 & 3 \times -3 \end{pmatrix}$

$$\begin{pmatrix} 2 & -6 \\ 3 & -9 \end{pmatrix}$$

c) $\begin{pmatrix} 1 & -x \\ -2 & 9 \end{pmatrix}\begin{pmatrix} 9 & x \\ 2 & 1 \end{pmatrix} = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$

$9 - 2x = 1$

$x = 4$

19 (a) $\dfrac{x=4}{7}$

b) $\begin{array}{r} 1016_9 \\ +\ 881_9 \\ \hline 2007_9 \end{array}$

c) $\begin{array}{r} 140_5 \\ -\ 133_5 \\ \hline 12_5 \end{array}$

$1 \times 5^1 + 2 \times 5^0 = 5 + 2$

$\begin{array}{r|l} 2 & 7 \\ 2 & 3 \ r \ 1 \\ 2 & 1 \ r \ 1 \\ & 0 \ r \ 1 \end{array} \uparrow$

111_2

20 a)
$$9 \ 30$$
$$+ \ 4. \ 00$$
$$\overline{13 \quad 30}$$

$$\underline{13 \ 30 \quad or \ 1.30 \ pm}$$

b) $6 + 6 = 12 \ km$

c) Ave Speed $= \dfrac{12}{4}$

$= 3 \ km/hr$

d) $\underline{1 \ hour}$

21 a)(i) $8 + 4 = \underline{12}$

(ii) $\underline{-1}$

(iii) $\underline{\dfrac{1}{4}}$

b) $3^{x + 2x} = 3^{3}$

$3x = 3$

$\underline{x = 1}$

22 a) $\underline{\triangle \; D \; C \; B}$

b) $\triangle ACE \; ||| \; \triangle DCB$

$$\frac{AC}{DC} = \frac{AE}{DB} = \frac{CE}{CB}$$

$$\frac{x+3}{4} = \frac{6}{3}$$

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

$$\underline{x = 5}$$

c) $\left(\frac{1}{2}\right)^2 = \frac{1}{4}$

Area $\triangle$ DCE $= \frac{1}{4} \times 24$

$\qquad = 6 \, cm^2$

$\therefore$ Area of ABDE

$\Rightarrow 24 - 6$

$\underline{\underline{18 \, cm^2}}$

23a) $9x + 2y = 360$ ----(1)

$9(180-x) = 2(180-y) + 1152$

$1620 - 9x = 360 - 2y + 1152$

$9x - 2y = 108$ ----(2)

b) $9x + 2y = 360$

$9x - 2y = 108$

$4y = 252$ $\qquad y = 63^{\circ}$

$$9x + 2y = 360$$
$$+ \quad + \quad +$$
$$9x - 2y = 108$$
$$\frac{18x}{18} = \frac{468}{18}$$

$$x = 26$$

$$x = 26 \quad \text{and} \quad y = 63$$

24 a) (i) $y = mx + c$
$$-3 = 3(2) + c$$
$$c = -9$$
$$\therefore y = 3x - 9$$

(ii) parallel

b) $2(2) + k^2 = 29$
$$\sqrt{k^2} = \sqrt{25}$$
$$k = \pm 5$$