(1) a) $\frac{4.32}{32.8 \times 0.593} = 0.222$

$= 2.22 \times 10^{-1}$

b) $(6.82 \times 10^5) \div (1.55 \times 10^{-2})$

$= 4.4 \times 10^7$ #

(2) a) $\frac{42}{48} = \frac{7}{8}$ #

b) $360^\circ \times \frac{6}{48} = 45^\circ$

(3) a) $\left(\frac{2}{x}\right)^{-3} = \left(\frac{x}{2}\right)^3$

$= \frac{x^3}{8}$ #

Ans

b) $2^{34} \div 16 = 2^k$

$2^{34} \div 2^4 = 2^k$

$2^{30} = 2^k$

Ans $k = 30$

4. a) 3 hour 41 min. $= 3\frac{41}{60}$ #

b) Distance travelled

$= 50 \times 3\frac{41}{60}$

$= 184\frac{1}{6}$

$= 184$ km #

5 a) 2 parts $\longrightarrow$ \$4.20

1 parts $\longrightarrow$ \$2.10

3 parts $\longrightarrow$ \$6.30

She spent \$6.30 #

b) x gram $\Longrightarrow$ \$0.99

1 gram $\Longrightarrow$ $\$\frac{0.99}{x} \Longrightarrow$ $\left(\frac{99}{100x}\right)$

Number of grams

$= \frac{y}{\left(\frac{99}{100x}\right)}$

$= \left(y\right) \times \left(\frac{100x}{99}\right)$

$= \frac{100xy}{99}$ #

(6) Perimeter of quad OABC

$= 6 + 6 + \left(\frac{\pi}{2}\right)(6)$

$= 12 + 3\pi$

Arc OC $= (\pi)(1.5)$

$= 1.5\pi$

∴ Perimeter of shaded region

$= (12 + 3\pi) + (1.5\pi) - 3$

$= 9 + 4.5\pi$.

(7) (i) 1 billion $= 10^9$

$k = \dfrac{1.03 \times 10^{10}}{10^9}$

$k = 10.3$ #

(i) Increase in population $= 1.03 \times 10^{10} - 6.5 \times 10^9$

$= 10^9(10.3 - 6.5)$

$= 3.8 \times 10^9$ #

(8) a) When $x = 0$

$3(0) + 2y = 8$

$y = 4$

$A = (0, 4)$

b) $3x + 2y = 8$

$2y = -3x + 8$

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

Gradient $\Rightarrow -\frac{3}{2}$ #

(9) $AC^2 = 17^2$

$= 289$

$AB^2 + BC^2 = 15^2 + 8^2$

$= 289$

Since $AC^2 = AB^2 + BC^2$ $\therefore$ $\triangle ABC$ is a right angle.

b) Area of $\triangle DAC$ = Area of $\triangle BDC$ − Area of $\triangle ABC$

$= \frac{1}{2}(20)(8) - \frac{1}{2}(15)(8)$

$= 20 \text{ cm}^2$ #

c) $\cos D\hat{A}C = -\frac{15}{17}$ #

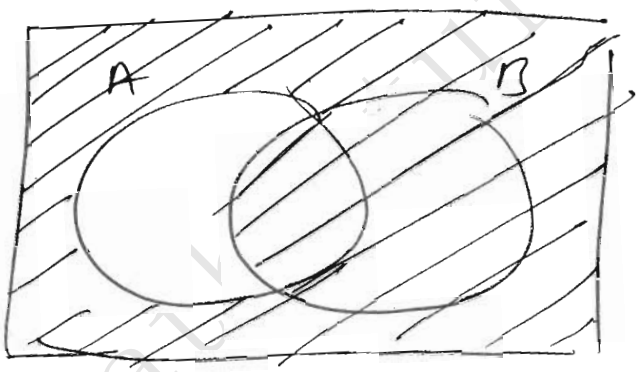
10a
$$\begin{pmatrix} 14 & 5 & 1 \\ 15 & 0 & 5 \end{pmatrix}\begin{pmatrix} 2 \\ 0 \\ -1 \end{pmatrix}$$

$$= \begin{pmatrix} 14(2) + 5(0) + (1)(-1) \\ 15(2) + (0)(0) + (5)(-1) \end{pmatrix}$$

$$= \begin{pmatrix} 27 \\ 25 \end{pmatrix}$$ ✗✗

b) 27 is Sandy's score and 25 is Roger's score for the test. ✗✗

11a)



✗✗

b) $P = \{2, 3, 5, 7, \ldots\}$

$S = \{4, 9, 16, \ldots\}$

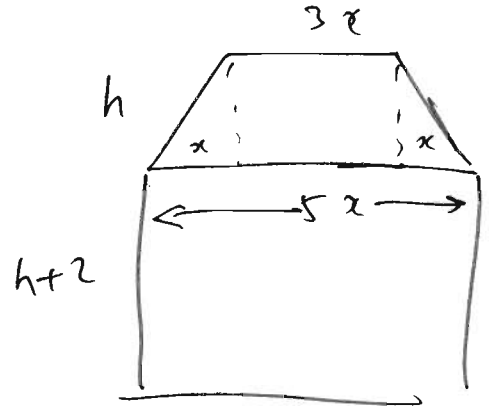
$T = \{2, 12, 22, \ldots\}$

$n(P \cap T) = 1$ ✗

$n(S \cap T) = 0$ ✗

Not sure whether which is asked 1st

12



$$A = \frac{1}{2}h(3x+5x) + (h+2)(5x)$$

$$= 4xh + 5xh + 10x$$

$$A = 9xh + 10x \quad \text{(shown)}$$

$$A = x(9h+10)$$

$$x = \frac{A}{9h+10} \quad \#$$

13

$$d \propto s^2$$

$$d = ks^2$$

$$s^2 = \frac{d}{k}$$

$$s = \sqrt{\frac{d}{k}}$$

When $s = p$, $d = 6$

$$p^2 = \frac{6}{k}$$

$$k = \frac{6}{p^2}$$

When $s = 4p$, $d = d_2$

$$(4p)^2 = \frac{d_2}{k}$$

$$k = \frac{d_2}{16p^2}$$

$\therefore \frac{6}{p^2} = \frac{d_2}{16p^2}$

$\frac{6}{p^2} \times 16p^2 = d_2$

b) $d_2 = 96$

Increase $= 90$

% Increase $= \frac{90}{6} \times 100\%$

$\Rightarrow 1500\%$

a) $\sqrt{\frac{d}{k}}$ m/s

14 (i) 22

Ans

$\frac{16+1}{2} = 8.5$

$= 8$th & 9th score

$= \frac{20+21}{2}$

Ans (ii) Median $= 20.5$

b) Interquantile range

$= 215 - 120$

$= 95$ g #

Ans

(15) a) $2x^3 - 13x^2 + 6x$

$= x(2x^2 - 13x + 6)$

Ans $= x(2x-1)(x-6)$ #

b) $9a^2 + 1 - (3a-1)^2$

$= 9a^2 + 1 - (9a^2 - 6a + 1)$

$= 9a^2 + 1 - 9a^2 + 6a - 1$

Ans $= 6a$

(16) a) Exterior $\angle = 180° - 165°$

$= 15°$

Number of sides $= \frac{360°}{15}$

Ans $= 24$ #

b) Total interior $= (7-2) \times 180°$

$= 900°$

Let the remaining int $\angle$ be x.

$x + 6(125) = 900°$

Ans $x = 150°$

(17) i) $1800 = 2^3 \times 3^2 \times 5^2$

$1800k = 2^3 \times 3^3 \times 5^3$

$k = 3 \times 5$

$= 15$ #

2	1800
2	900
2	450
3	225
3	75
5	25
5	5
	1

$42 = 2 \times 3 \times 7$

$= 2 \times 3$

Ans $= 6$

2	42
3	21
7	7

b) LCM $= 2^2 \times 3^3 \times 5$ $12 = 2^2 \times 3$

$= 540$ $27 = 3^3$

$90 = 2 \times 3^2 \times 5$

$\Rightarrow$ 9 min 0909.

Then next Alan together at

(a) i $2 - 2x > 9$

$-2x > 7$

Ans (2) $x < -3.5$

ii) Greatest integer value of x is -4.

b) $x - 2y = 8$

$x = 2y + 8$ — (1)

$3x = 19 + 4y$ — (2)

Sub (1) into (2)

$3(2y+8) = 19 + 4y$

$6y + 24 = 19 + 4y$

$2y = -5$

From (1), $y = -2.5$

$x - (2)(-2.5) = 8$

$x + 5 = 8$

$x = 3$ ✱✱

Ans (2) $x = 3, y = -2.5$

(19) a) $\frac{45}{125} = \frac{A_1}{A_2}$

$\frac{9}{25} = \left(\frac{L_1}{L_2}\right)^2$

$\frac{L_1}{L_2} = \frac{3}{5}$ #

Ans 2 $\Rightarrow$ 3 : 5

b) $\frac{A_1}{A_2} = \frac{45}{125}$

$\frac{63}{A_2} = \frac{45}{125}$

$(125)(63) = 45A_2$

$A_2 = 175$

Surface area of the top of larger jug.

$\Rightarrow 175\ cm^2$

c) $\left(\frac{V_1}{V_2}\right) = \left(\frac{L_1}{L_2}\right)^3$

$\frac{V_1}{V_2} = \left(\frac{3}{5}\right)^3$

$\frac{V_1}{2.5l} = \frac{27}{125}$

$V_1 = 0.54l$

$= 540\ cm^3$

Ans 2

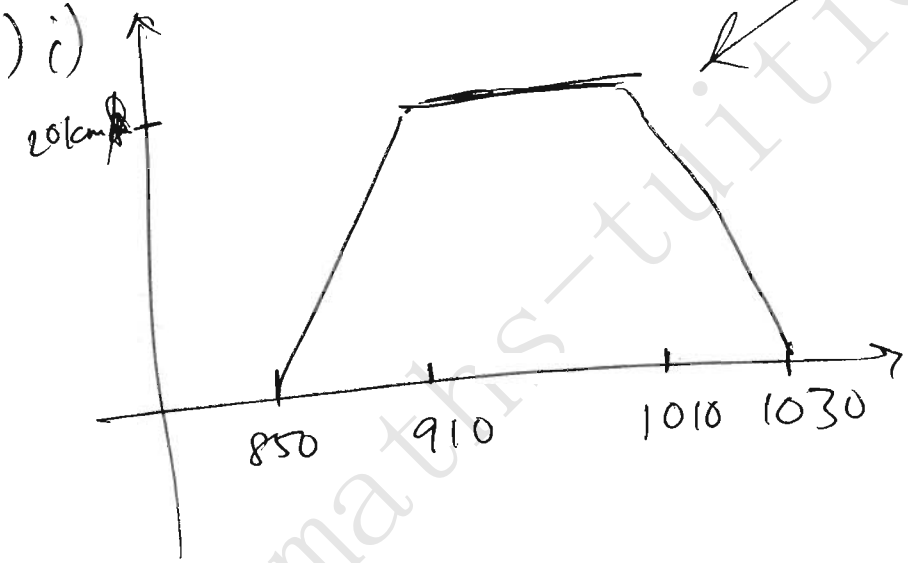
20a) (Home to cente)'s speed $= \frac{20\text{km}}{50\text{min}}$

$= \frac{20\text{km}}{\frac{5}{6}\text{hr.}}$

Ans 2 $= 24\text{km/h}$

b) Ans 2 $\frac{1}{5} \times 20\text{km} = 4\text{km}$

c) i)



ii) Pan Alan at 1022 .

21 a) (i) $\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$

Ans (i) $= -3\underset{\sim}{a} + 4\underset{\sim}{b}$

(ii) $\overrightarrow{AX} = \frac{3}{4}\overrightarrow{AB}$

$\overrightarrow{AX} = \frac{3}{4}(-3\underset{\sim}{a} + 4\underset{\sim}{b})$

$\overrightarrow{AX} = \frac{-9}{4}\underset{\sim}{a} + 3\underset{\sim}{b}$

$\overrightarrow{BX} = \frac{1}{4}$ a

(iii) $\overrightarrow{OX} = \overrightarrow{OB} + \overrightarrow{BX}$

$= 4\underset{\sim}{b} + \frac{1}{4}(-\overrightarrow{AB})$

$= 4\underset{\sim}{b} - \frac{1}{4}(-3\underset{\sim}{a} + 4\underset{\sim}{b})$

$= 4\underset{\sim}{b} + \frac{3}{4}\underset{\sim}{a} - \underset{\sim}{b}$

Ans $\overrightarrow{OX} = \frac{3}{4}\underset{\sim}{a} + 3\underset{\sim}{b} \Rightarrow \frac{3}{4}(\underset{\sim}{a} + 4\underset{\sim}{b})$

$\overrightarrow{BY} = \frac{1}{3}\overrightarrow{OA}$

$\overrightarrow{BX} + \overrightarrow{XY} = \frac{1}{3}(3\underset{\sim}{a})$

$\overrightarrow{XY} = \underset{\sim}{a} - \overrightarrow{BX}$

$= \underset{\sim}{a} - (\frac{3}{4}\underset{\sim}{a} - \underset{\sim}{b})$

$\overrightarrow{XY} = \frac{1}{4}\underset{\sim}{a} + \underset{\sim}{b} \Rightarrow \frac{1}{4}(\underset{\sim}{a} + 4\underset{\sim}{b})$

Since $\overrightarrow{OX} = 3\overrightarrow{XY}$, $\therefore$ OX // XY

Share common pt X.

$\therefore$ O, X and Y lies in a straight line..

22a) $y = x(3-x)$

when $x = 0$

$y = 0 \quad (0,0)$

when $y = 0$

$x(3-x) = 0$

$x = 0$ or $x = 3 \quad (0,0) \quad (3,0)$

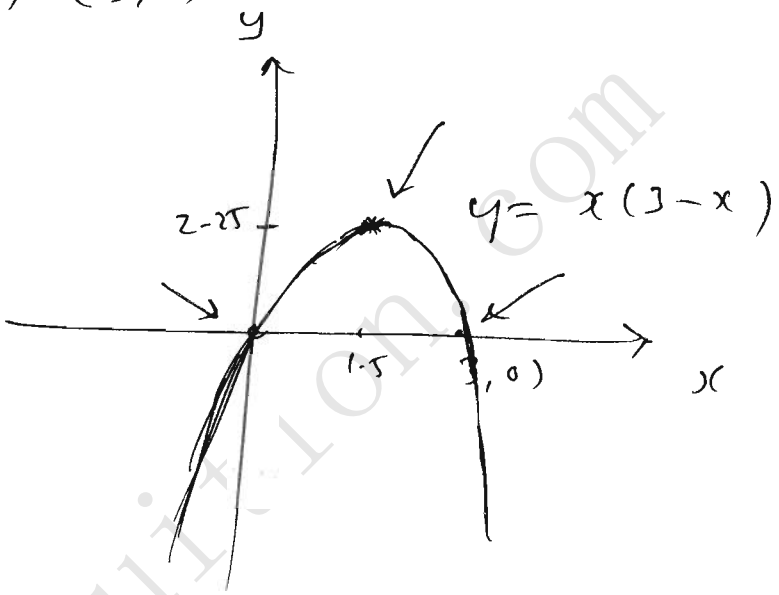
line of symmetry

$\Rightarrow x = \frac{0+3}{2}$

$x = 1.5$

$y = 1.5(1.5)$

$= 2.25$



b) $y = (x+2)^2 - 1$

when $x = 0$

$y = 3 \quad (0,3)$

min pt $= (-2,-1)$