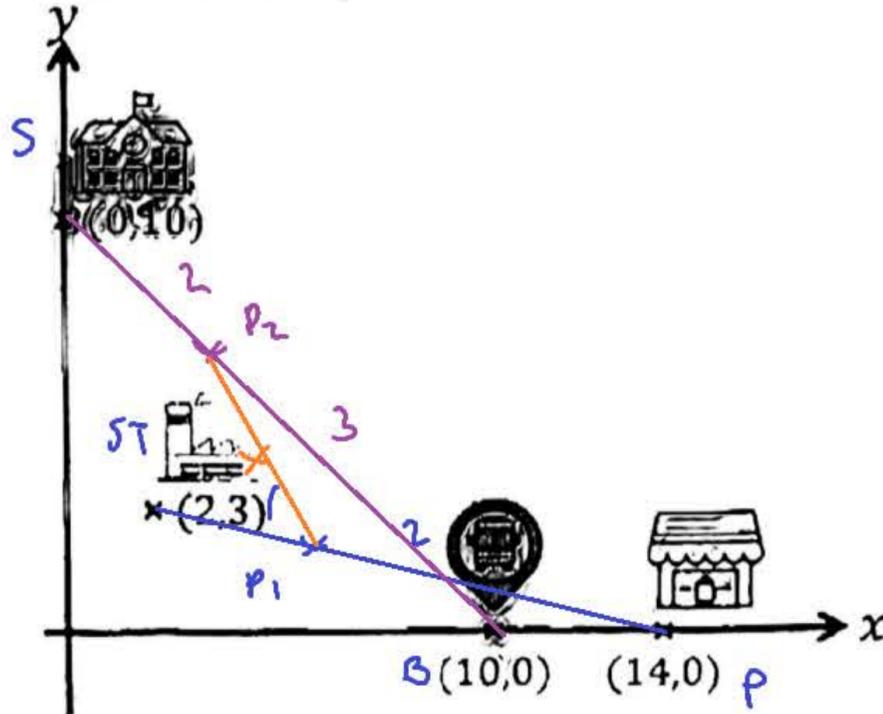


- 1 Rajah 1 di bawah menunjukkan kedudukan Kilang ST, sekolah, pasar awam dan perhentian bas pada satah Cartes. Rumah Amira terletak di titik tengah P_1P_2 dengan keadaan P_1 membahagi tembereng garis dari Kilang ST ke pasar awam dengan nisbah 1:2 manakala P_2 pula membahagi tembereng garis dari sekolah ke perhentian bas dengan nisbah 2:3.

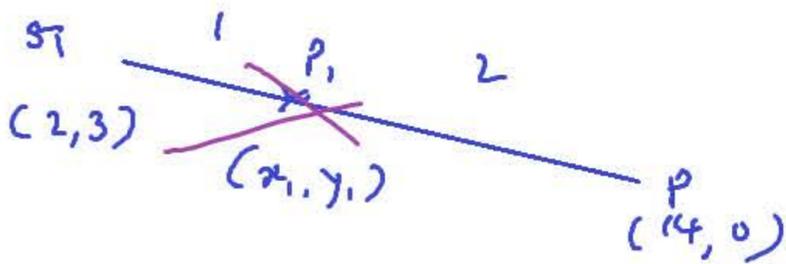
The diagram 1 below shows the position of the Factory ST, school, market and bus stop on a Cartesian plane. Amira's house is at the midpoint of P_1P_2 such that P_1 divides the line segment from the Factory ST to the market in the ratio 1:2, while P_2 divides the line segment from the school to the bus stop in the ratio 2:3.



Rajah 1 / Diagram 1

Tentukan titik bagi kedudukan rumah Amira dan jarak dari sekolah.
Determine the position of Amira's house and distance from the school.

[8 markah/marks]



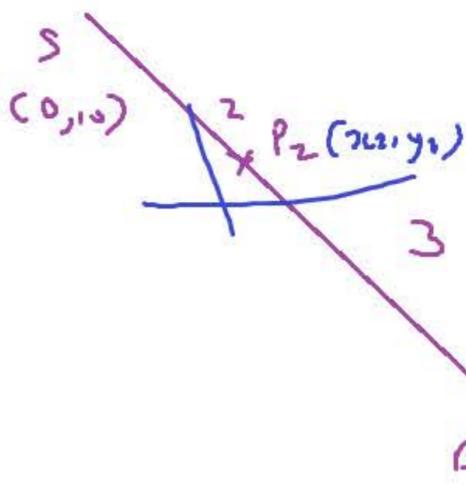
$$x_1 = \frac{1(14) + 2(2)}{1+2}$$

$$y_1 = \frac{1(0) + 2(3)}{1+2}$$

$$= 6$$

$$= 2$$

$$P_1(6, 2)$$



$$x_2 = \frac{2(10) + 3(0)}{2+3}$$

$$y_2 = \frac{2(0) + 3(10)}{2+3}$$

$$= 4$$

$$= 6$$

$$P_2(4, 6)$$

$$P_1(6, 2), P_2(4, 6)$$

$$\text{Rumah} = \left(\frac{6+4}{2}, \frac{2+6}{2} \right)$$

$$R = (5, 4)$$

7

$$S(0, 10)$$

$$d = \sqrt{(5-0)^2 + (4-10)^2}$$

$$= \sqrt{61} = 7.81 \text{ units}$$

$$\sqrt{5^2+6^2}$$

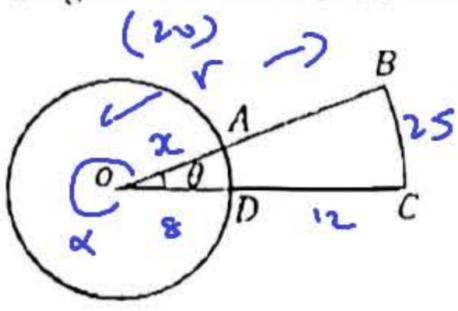
$$\sqrt{61}$$

$$\sqrt{5^2+6^2}$$

$$7.810249676$$

2 Rajah 2 menunjukkan sebuah bulatan berjari x cm dan sector OBC berpusat O .
 Diagram 2 shows a circle with radius of x cm and a sector OBC with centre O .

TS
 B1



Diberi bahawa panjang lengkok BC ialah 25 cm, perimeter sektor OBC ialah 65 cm dan $OA:AB = 2:3$. Dengan menggunakan $\pi = 3.142$, cari
 Given that the length of arc BC is 25 cm, perimeter sector OBC is 65 cm and $OA:AB = 2:3$. By using $\pi = 3.142$, find

(a) θ dalam sebutan x ,
 θ in terms of x ,

[1 markah/mark]

(b) luas dan perimeter keseluruhan rajah tersebut.
 the area and perimeter of the whole diagram.

[5 markah/marks]

(a)

$$s = r\theta$$

$$25 = \left(\frac{5x}{2}\right)\theta$$

OA	AB	OB	
2	3	5	
x	x	r	$= \frac{5x}{2}$

$$\theta = \frac{25 \times 2}{5x}$$

$$\theta = \frac{10}{x}$$

(b)

$$r + r + 25 = 65$$

$$2r = 40$$

$$r = 20$$

OA	AB	OB	
2	3	5	
8	12	20	$\downarrow \times 4$

$$s = r\theta$$

$$25 = 20\theta$$

$$\theta = \frac{25}{20} = \frac{5}{4}$$

$$\approx 1.25$$

$$\alpha = 2\pi - 1.25$$

$$A_{\text{AOD}} = 8(2\pi - 1.25) =$$

$$\boxed{8(2 \times 3.142 - 1.25)}$$

$$\boxed{40.272}$$

$$P = 40.27 + 12 + 12 + 25$$

$$\approx 89.27 \text{ cm}$$

$$A = \frac{1}{2}r^2\theta$$

$$A_{\text{OBC}} = \frac{1}{2}(20)^2(1.25)$$

$$= \boxed{0.5 \times 20^2 \times 1.25}$$

$$\boxed{250}$$

$$A_{\text{AOD}} = \frac{1}{2}(8)^2(2\pi - 1.25)$$

$$= \boxed{0.5 \times 8^2 \times (2\pi - 1.25)}$$

$$\boxed{161.0619298}$$

$$A = 250 + 161.1$$

$$\approx 411.1 \text{ cm}^2$$

3 Sebuah tangki silinder tertutup mempunyai tinggi h meter dan jejari r meter. Tangki itu boleh diisi penuh dengan $36\pi r$ m³ air. Luas permukaan tangki ialah $32\pi r$ m².
A closed cylindrical tank has a height of h metres and a radius of r metres. The tank can be fully filled with $36\pi r$ m³ of water. Surface area of the tank is $32\pi r$ m².

74
 B2
 S
 B4

(a) Cari h dalam sebutan r .
 Find h in terms of r .

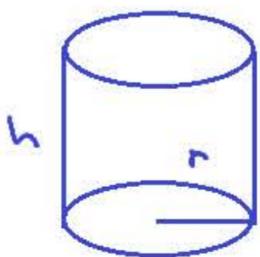
[1 markah/mark]

(b) Buktikan $r^2 - 16r + 36 = 0$.
 Prove $r^2 - 16r + 36 = 0$.

[3 markah/marks]

(c) Seterusnya, cari nilai h dan r dalam bentuk $a + b\sqrt{c}$.
 Hence, find values of h and r in the form of $a + b\sqrt{c}$.

[4 markah/marks]



a) $V = 36\pi r$

$$\pi r^2 h = 36\pi r$$

$$h = \frac{36\cancel{\pi r}}{\pi r^{\cancel{2}}}$$

$$h = \frac{36}{r} \quad \text{--- (1)}$$

b) S.A. = $32\pi r$

$$2\pi r^2 + 2\pi r h = 32\pi r$$

$$2r^2 + 2rh = 32r$$

$$r^2 + rh = 16r$$

$$r^2 - 16r + rh = 0 \quad \text{--- (2)}$$

Sub (1) into (2)

$$r^2 - 16r + r\left(\frac{36}{r}\right) = 0$$

$$r^2 - 16r + 36 = 0$$

(shown)

$$a=1, \quad b=-16, \quad c=36$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$r = \frac{-(-16) \pm \sqrt{(-16)^2 - 4(1)(36)}}{2(1)}$$

$ax^2+bx+c=0$ $x_1 =$ $8+2\sqrt{7}$

$$= \frac{16}{2} \pm \frac{\sqrt{112}}{2} = 8 \pm 2\sqrt{7}$$

$$\frac{\sqrt{112}}{2} = \frac{\sqrt{16 \times 7}}{2}$$

$$= 8 \pm 2\sqrt{7}$$

$$= \frac{4\sqrt{7}}{2}$$

$$= 2\sqrt{7}$$

$$h = \frac{36}{(8+2\sqrt{7})(8-2\sqrt{7})}$$

$$h = \frac{36}{8-2\sqrt{7}(8+2\sqrt{7})}$$

$$h = \frac{36}{r}$$

$$= \frac{36(8-2\sqrt{7})}{64 - 4(7)} = 36$$

$$= \frac{36(8+2\sqrt{7})}{64 - 4(7)}$$

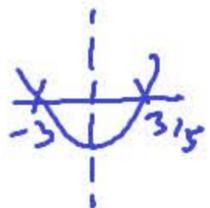
$$= 8 - 2\sqrt{7}$$

$$= 8 + 2\sqrt{7}$$

$$\therefore r = 8 + 2\sqrt{7}, \quad h = 8 - 2\sqrt{7}$$

$$r = 8 - 2\sqrt{7}, \quad h = 8 + 2\sqrt{7}$$

4 (a) Diberi -3 dan $\frac{3}{5}$ ialah punca-punca bagi persamaan kuadratik $5x^2 - 3(p-5)x + 3q = 0$.
 Given -3 and $\frac{3}{5}$ are the roots of the quadratic equation $5x^2 - 3(p-5)x + 3q = 0$.



(i) Nyatakan paksi simetri.

State the axis of symmetry.

$$s.o.r. = -\frac{b}{a}$$

[1 markah/mark]

$$p.o.r. = \frac{c}{a}$$

$$x = \frac{-3 + \frac{3}{5}}{2}$$

$$x = -\frac{6}{5}$$

(ii) Cari nilai p dan q .

Find the value of p and q .

[3 markah/marks]

s.o.r. $-3 + \frac{3}{5} = -\frac{(-3)(p-5)}{5}$

$$-\frac{12}{5} = \frac{3}{5}(p-5)$$

$$-4 + 5 = p$$

$$p = 1$$

p.o.r. $(-3) \left(\frac{3}{5}\right) = \frac{3q}{5}$

$$-\frac{9}{5} = \frac{3q}{5}$$

$$q = -3$$

$$\therefore p = 1, q = -3 \neq$$

(b) Cari julat nilai x jika $x^2 - 4x + 3 > 0$ dan $x^2 - 4x \leq 0$. Seterusnya, selesaikan ketaksamaan $-5 < x^2 - 4x \leq 0$.

Find the range of x for $x^2 - 4x + 3 > 0$ and $x^2 - 4x \leq 0$. Hence, solve the inequality $-5 < x^2 - 4x \leq 0$.

[3 markah/marks]

$$x^2 - 4x + 3 > 0$$

$$x^2 - 4x \leq 0$$

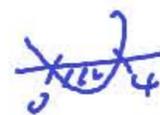
$$(x-1)(x-3) > 0$$

c.v. $x=1, x=3$



$$x(x-4) \leq 0$$

c.v. $x=0, x=4$



$$x < 1, x > 3$$

$$0 \leq x \leq 4$$

$$-5 < x^2 - 4x \leq 0$$

$$x^2 - 4x \leq 0$$

$$-5 < x^2 - 4x$$

$$0 \leq x \leq 4$$

$$0 < x^2 - 4x + 5$$

$$x < 1, x > 3$$



$$0 \leq x < 1 \quad 3 < x \leq 4$$

$$-5 < x^2 - 4x \leq 0$$

$$x^2 - 4x \leq 0$$

$$-5 < x^2 - 4x$$

$$b^2 - 4ac = (-4)^2 - 4(1)(5)$$

$$0 \leq x \leq 4$$

$$0 < x^2 - 4x + 5$$

$$= 16 - 20$$

$$= -4 < 0$$

always > 0

no real roots

$$x^2 - 4x + 5 = x^2 - 4x + \left(\frac{-4}{2}\right)^2 - \left(\frac{-4}{2}\right)^2 + 5$$

$$= (x-2)^2 - 4 + 5$$

$$= (x-2)^2 + 1 > 0$$

75
34

- 5 Sebuah jawatankuasa yang terdiri daripada lima orang ahli perlu dipilih daripada lima orang lelaki dan tiga orang wanita yang mempunyai sepasang suami isteri. Cari bilangan jawatankuasa yang boleh dibentuk jika
- A committee of five shall be elected out of five men and three women including one married couple. Find the number of committees that can be formed if*

(a) tiada syarat,
there is no condition,

$$5L C 3 \quad 3W C 2$$

(b) mengandungi tiga orang lelaki dan dua orang wanita,
it contains three men and two women,

(c) mengandungi salah seorang suami atau pun isteri.
it contains one of the husband or wife.

(c) both h & w $8-2=6$ $5-2=3$

$$6C_3$$

6C3
20

no h & w $8-2=6$ C_5

$$6C_5$$

6C5
6

$$56 - 20 - 6 = 30 \quad 4$$

$$5L \quad 3W$$

$$C_5$$

$$n = 5 + 3 = 8$$

$$8C_5 = 56$$

[2 markah/marks]

8C5
56

[2 markah/marks]

$$b) 5C_3 \times 3C_2$$

[2 markah/marks]

$$= 30$$

5C3 x 3C2
30

$a=20$ $r=1\frac{1}{2} = \frac{3}{2}$ G.P.

6 Sebuah stadium terbuka mempunyai 20 buah kerusi pada baris pertama. Bilangan kerusi pada baris berikutnya adalah satu setengah kali bilangan kerusi pada baris sebelumnya.
An open stadium has 20 chairs in the first row. The number of chairs in the next row is one and a half times the number of chairs of the previous row.

(a) Hitung bilangan kerusi yang terdapat pada baris ke-10.
Calculate the number of chairs in the 10th row.

[2 markah/marks]

(b) Baris yang manakah mempunyai sekurang-kurangnya 515 buah kerusi?
Which row has at least 515 chairs?

[3 markah/marks]

(c) Cari jumlah kerusi yang disusun dari baris ketiga hingga baris kelapan.
Find the total number of chairs arranged from the third row to the eighth row.

[3 markah/marks]

$a=20$ $r=1\frac{1}{2} = \frac{3}{2}$ G.P. $T_n = ar^{n-1}$

a) $T_{10} = 20 \left(\frac{3}{2}\right)^{10-1}$
 $= 769$ kerusi

20×1.5^9
768.8671875

b) $T_n > 515$
 $20 \left(\frac{3}{2}\right)^{n-1} > 515$
 $1.5^{n-1} > 25.75$

$(n-1) \ln 1.5 > \ln 25.75$ $> 1 = +ve$
 $n-1 > \frac{\ln 25.75}{\ln 1.5}$

$n-1 > 8.01$

$n > 9.01$

$\therefore n = 10$

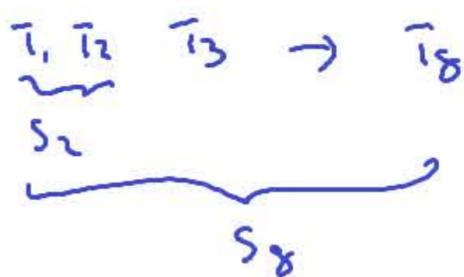
$\frac{\ln(25.75)}{\ln(1.5)}$
8.011625568

$n=9$

$20 \times 1.5^{(9-1)}$
512.578125 < 515

$n=10$

20×1.5^9
$T_{10} = 768.8671875 > 515$



$S_8 - S_2$
 $= \frac{20(1.5^8 - 1)}{1.5 - 1} - \frac{20(1.5^2 - 1)}{1.5 - 1}$

$= \frac{20(1.5^8 - 1)}{1.5 - 1} - \frac{20(1.5^2 - 1)}{1.5 - 1}$

985.15625
50

$= 935$

$20, 30, 45, 67.5, 101.25, 151.875, 227.8125$

$45+67.5+101.25+151.875$
345.625

Ans $\times 1.5$
T_8 341.71875

7 (a) Tentukan nilai had bagi setiap fungsi yang berikut.
 Determine the limit value for each of the following functions.

[2 markah/marks]

TS
B2

$$(i) \quad \begin{aligned} \text{had}_{x \rightarrow -1} \frac{x^2 - 1}{x + 1} &= \lim_{x \rightarrow -1} \frac{(x+1)(x-1)}{(x+1)} \\ \lim_{x \rightarrow -1} \frac{x^2 - 1}{x + 1} &= \lim_{x \rightarrow -1} (x-1) \\ &= -1 - 1 \\ &= -2 \end{aligned}$$

$$(ii) \quad \begin{aligned} \text{had}_{x \rightarrow 0} \frac{\sqrt{x+4} - 2}{x} &= \lim_{x \rightarrow 0} \frac{(\sqrt{x+4} - 2)(\sqrt{x+4} + 2)}{x(\sqrt{x+4} + 2)} \\ \lim_{x \rightarrow 0} \frac{\sqrt{x+4} - 2}{x} &= \lim_{x \rightarrow 0} \frac{x+4 - 4}{x(\sqrt{x+4} + 2)} \end{aligned}$$

[2 markah/marks]

$$\begin{aligned} &= \lim_{x \rightarrow 0} \frac{x}{x(\sqrt{x+4} + 2)} \\ &= \frac{1}{\sqrt{0+4} + 2} = \frac{1}{4} \end{aligned}$$

(b) Dengan menggunakan prinsip pertama, cari fungsi kecerunan bagi lengkung
 By using first principles, find the gradient function to the curve

[3 markah/marks]

$$\begin{aligned} ((x-1) + \delta x)^2 &= (x-1)^2 - 4x + 3 \\ y + \delta y &= (x + \delta x - 1)^2 - 4(x + \delta x) + 3 \\ &= (x-1)^2 + 2(x-1)(\delta x) + (\delta x)^2 - 4x - 4\delta x + 3 \end{aligned}$$

$$\begin{aligned} \frac{dy}{dx} &= 2(x-1)(1) - 4 \\ &= 2x - 2 - 4 \\ &= 2x - 6 \end{aligned}$$

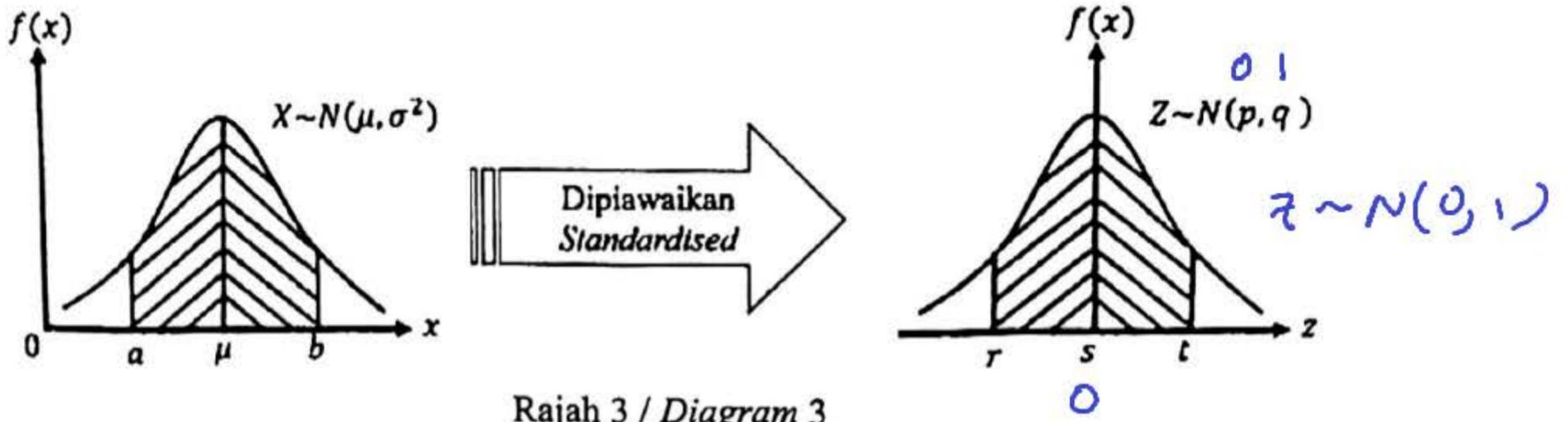
$$\begin{aligned} \delta y &= (y + \delta y) - y \\ &= 2(x-1)(\delta x) + (\delta x)^2 - 4\delta x \end{aligned}$$

$$\frac{\delta y}{\delta x} = 2(x-1) + \delta x - 4$$

$$\frac{dy}{dx} = \lim_{\delta x \rightarrow 0} \frac{\delta y}{\delta x} = \lim_{\delta x \rightarrow 0} (2(x-1) + \delta x - 4)$$

$$\begin{aligned} &= 2(x-1) + 0 - 4 = 2x - 2 - 4 \\ &= 2x - 6 \end{aligned}$$

- 8 (a) Rajah 3 di bawah menunjukkan hubungan antara graf taburan normal dengan graf taburan normal piawai.
 The diagram 3 below shows the relation between the normal distribution graph and the standard normal distribution graph.

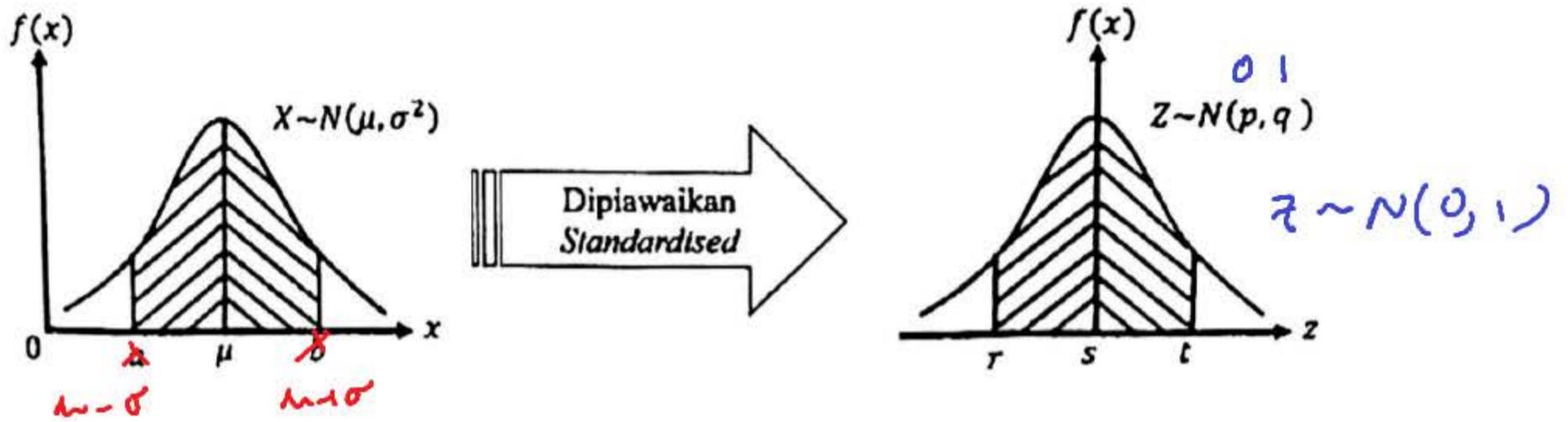


Rajah 3 / Diagram 3

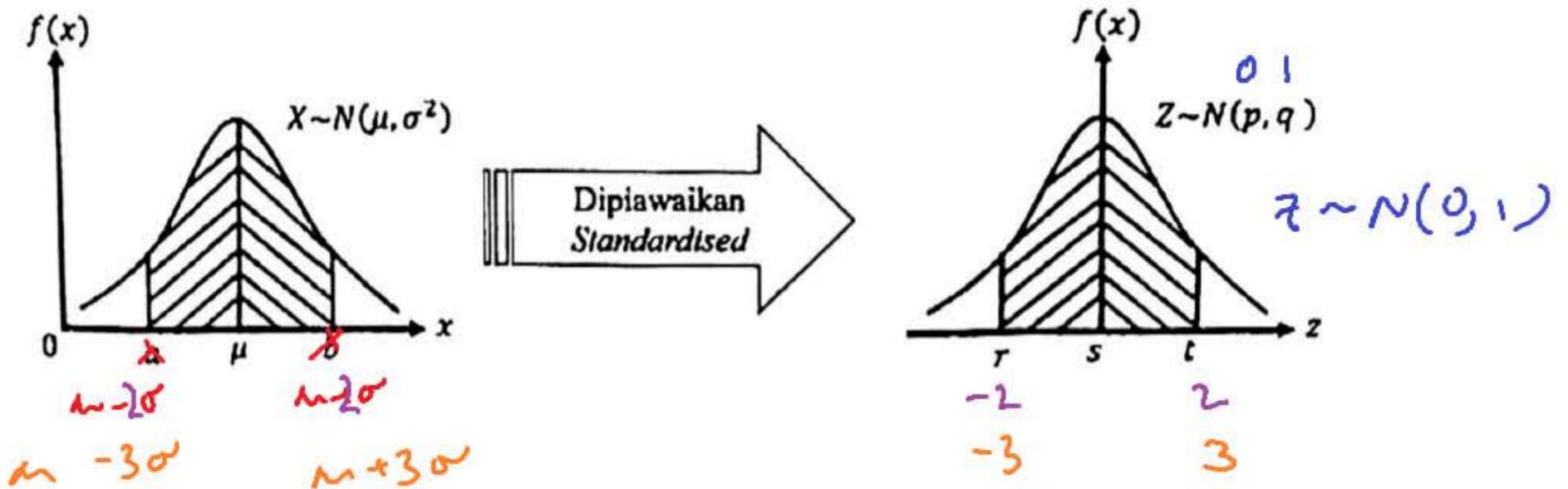
Nyatakan nilai p, q, r, s dan t .
 State the values of p, q, r, s and t .

[2 markah/mark]

$$r = \frac{a - \mu}{\sigma} \quad t = \frac{b - \mu}{\sigma} \quad s = 0, \quad p = 0, \quad q = 1$$



$$r = \frac{\mu - \sigma - \mu}{\sigma} = -\frac{\sigma}{\sigma} = -1 \quad t = \frac{\mu + \sigma - \mu}{\sigma} = \frac{\sigma}{\sigma} = 1$$



- (b) Jadual 1 di bawah menunjukkan proses pengredan yang dilakukan oleh pengusaha dusun X, sebelum pengagihan jambu batu mengikut jisim dan harganya.
Table 1 below shows the grading process conducted by the orchard operator X, before the distribution of guava according to its weight and price.

Gred/ Grade	A	B	C
Jisim, $X(g)$ Mass, $X(g)$	$X > 450$	$300 < X \leq 450$	$q < X \leq 300$
Harga sekilogram Price per kilogram	RM 15	RM 12	RM 8

Jadual 1 / Table 1

Diberi bahawa jisim buah jambu batu yang dihasilkan bertaburan secara normal dengan min 370 g dan sisihan piawai 50 g.

Given that the masses of the guavas that produced in the orchard are normally distributed with a mean of 370 g, and a standard deviation of 50 g.

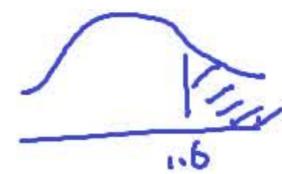
- (i) Jika sebiji jambu batu dipilih secara rawak, cari kebarangkalian buah jambu batu itu ialah Gred A.
If a guava is picked at random, find the probability that guava is Gred A.
 [2 markah/marks]
- (ii) Sebuah bakul mempunyai 400 kg jambu batu, anggarkan jumlah harga jambu batu Gred B.
A basket contains 400 kg guavas, estimate the total price for Gred B guava.
 [2 markah/marks]
- (iii) Jika 95% daripada semua jambu batu boleh digredkan dan dijual, cari jisim minimum buah jambu batu yang boleh digredkan dan dijual.
If 95% from all the guavas can be grading and sell, find the minimum mass of the guavas that can be grading and sell.
 [2 markah/marks]
- (iv) Tentukan pendapatan jika 150 bakul jambu batu dihasilkan.
Determine the income if 150 baskets of guavas are produced.
 [2 markah/marks]

$$\mu = 370g \quad \sigma = 50g \quad X \sim N(370, 50^2)$$

$$(i) P(X > 450) = P\left(Z > \frac{450 - 370}{50}\right)$$

$$\begin{array}{|c|} \hline 0.0548 \\ \hline \end{array}$$

$$= P(Z > 1.6) \\ = 0.0548$$



$$(ii) P(300 < X < 450) = P\left(\frac{300 - 370}{50} < Z < \frac{450 - 370}{50}\right)$$

$$\begin{array}{|c|} \hline 0.0808 \\ \hline \end{array}$$

$$= P(-1.4 < Z < 1.6)$$

$$= 1 - 0.0808 - 0.0548$$

$$= 0.8644$$



$$\begin{array}{|c|} \hline 1 - 0.0808 - 0.0548 \\ \hline \end{array}$$

$$\sim p = 400(0.8644)$$

$$= \begin{array}{|c|} \hline \text{Ans} \times 400 \\ \hline \end{array}$$

$$345.76 \text{ kg}$$

$$\text{Harga} = 345.76 \times \text{RM } 12$$

$$= \text{RM } 4149.12$$

$$\begin{array}{|c|} \hline \text{Ans} \times 12 \\ \hline \end{array}$$

$$4149.12$$

$$X \sim N(370, 50^2)$$

$$P(X > q) = 0.95$$

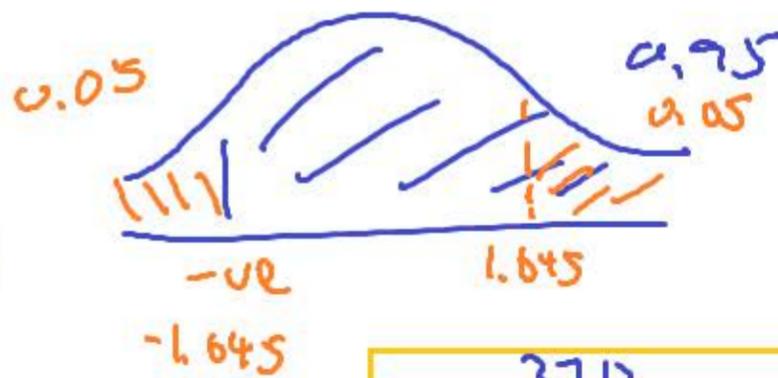
$$P\left(Z > \frac{q-370}{50}\right) = 0.95$$

from table

$$P(Z > -1.645) = 0.95 \quad (1-0.05)$$

$$P\left(Z < \frac{q-370}{50}\right) = 0.05$$

$$P(Z < -1.645) = 0.05$$



$$\frac{q-370}{50} = -1.645$$

$$q = -1.645(50) + 370 = 287.75 \text{ g}$$

400 kg

Gred/ Grade	A	B	C
Jisim, X(g) Mass, X(g)	$X > 450$	$300 < X \leq 450$	$4 < X \leq 300$
Harga sekilogram Price per kilogram	RM 15	RM 12	RM 8

no grade

p

0.0548

0.8644

$$1 - 0.0548 - 0.8644 = 0.0308$$

$$1 - 0.95 = 0.05$$

n p

$$400 \times 0.0548 = 21.92$$

$$400 \times 0.8644 = 345.76$$

$$400 \times 0.0308 = 12.32$$

Harga sebakul

$$15 \times 21.92 = 328.8$$

$$345.76 \times 12 = 4149.12$$

$$12.32 \times 8 = 98.56$$

$$328.8 + 4149.12 + 98.56 = \text{RM } 4576.48$$

pendapatan = 150 x RM 4576.48

= RM 686472

$$\text{Ans} \times 150 = 686472$$

THE UPPER TAIL PROBABILITY $Q(z)$ FOR THE NORMAL DISTRIBUTION $N(0, 1)$
 KEBARANGKALIAN HUJUNG ATAS $Q(z)$ BAGI TABURAN NORMAL $N(0, 1)$

z											TOLAK								
	0	1	2	3	4	5	6	7	8	9	1	2	3	4	5	6	7	8	9
0.0	.5000	.4960	.4920	.4880	.4840	.4801	.4761	.4721	.4681	.4641	4	8	12	16	20	24	28	32	36
0.1	.4602	.4562	.4522	.4483	.4443	.4404	.4364	.4325	.4286	.4247	4	8	12	16	20	24	28	32	36
0.2	.4207	.4168	.4129	.4090	.4052	.4013	.3974	.3936	.3897	.3859	4	8	12	15	19	23	27	31	35
0.3	.3821	.3783	.3745	.3707	.3669	.3632	.3594	.3557	.3520	.3483	4	7	11	15	19	22	26	30	34
0.4	.3446	.3409	.3372	.3336	.3300	.3264	.3228	.3192	.3156	.3121	4	7	11	14	18	22	25	29	32
0.5	.3085	.3050	.3015	.2981	.2946	.2912	.2877	.2843	.2810	.2776	3	7	10	14	17	20	24	27	31
0.6	.2743	.2709	.2676	.2643	.2611	.2578	.2546	.2514	.2483	.2451	3	7	10	13	16	19	23	26	29
0.7	.2420	.2389	.2358	.2327	.2296	.2266	.2236	.2206	.2177	.2148	3	6	9	12	15	18	21	24	27
0.8	.2119	.2090	.2061	.2033	.2005	.1977	.1949	.1922	.1894	.1867	3	5	8	11	14	16	19	22	25
0.9	.1841	.1814	.1788	.1762	.1736	.1711	.1685	.1660	.1635	.1611	3	5	8	10	13	15	18	20	23
1.0	.1587	.1562	.1539	.1515	.1492	.1469	.1446	.1423	.1401	.1379	2	5	7	9	12	14	16	19	21
1.1	.1357	.1335	.1314	.1292	.1271	.1251	.1230	.1210	.1190	.1170	2	4	6	8	10	12	14	16	18
1.2	.1151	.1131	.1112	.1093	.1075	.1056	.1038	.1020	.1003	.0985	2	4	6	7	9	11	13	15	17
1.3	.0968	.0951	.0934	.0918	.0901	.0885	.0869	.0853	.0838	.0823	2	3	5	6	8	10	11	13	14
1.4	.0808	.0793	.0778	.0764	.0749	.0735	.0721	.0708	.0694	.0681	1	3	4	6	7	8	10	11	13
1.5	.0668	.0655	.0643	.0630	.0618	.0606	.0594	.0582	.0571	.0559	1	2	4	5	6	7	8	10	11
1.6	.0548	.0537	.0526	.0516	.0505	.0495	.0485	.0475	.0465	.0455	1	2	3	4	5	6	7	8	9
1.7	.0446	.0436	.0427	.0418	.0409	.0401	.0392	.0384	.0375	.0367	1	2	3	4	4	5	6	7	8
1.8	.0359	.0351	.0344	.0336	.0329	.0322	.0314	.0307	.0301	.0294	1	1	2	3	4	4	5	6	6
1.9	.0287	.0281	.0274	.0268	.0262	.0256	.0250	.0244	.0239	.0233	1	1	2	2	3	4	4	5	5
2.0	.0228	.0222	.0217	.0212	.0207	.0202	.0197	.0192	.0188	.0183	0	1	1	2	2	3	3	4	4
2.1	.0179	.0174	.0170	.0166	.0162	.0158	.0154	.0150	.0146	.0143	0	1	1	2	2	2	3	3	4
2.2	.0139	.0136	.0132	.0129	.0125	.0122	.0119	.0116	.0113	.0110	0	1	1	1	2	2	2	3	3
2.3	.0107	.0104	.0102								0	1	1	1	1	2	2	2	2
				.0 ² 990	.0 ² 964	.0 ² 939	.0 ² 914				3	5	8	10	13	15	18	20	23
								.0 ² 889	.0 ² 866	.0 ² 842	2	5	7	9	12	14	16	18	21
2.4	.0 ² 820	.0 ² 798	.0 ² 776	.0 ² 755	.0 ² 734						2	4	6	8	11	13	15	17	19
						.0 ² 714	.0 ² 695	.0 ² 676	.0 ² 657	.0 ² 639	2	4	6	7	9	11	13	15	17
2.5	.0 ² 621	.0 ² 604	.0 ² 587	.0 ² 570	.0 ² 554	.0 ² 539	.0 ² 523	.0 ² 508	.0 ² 494	.0 ² 480	2	3	5	6	8	9	11	12	14
2.6	.0 ² 466	.0 ² 453	.0 ² 440	.0 ² 427	.0 ² 415	.0 ² 402	.0 ² 391	.0 ² 379	.0 ² 368	.0 ² 357	1	2	3	5	6	7	8	9	10
2.7	.0 ² 347	.0 ² 336	.0 ² 326	.0 ² 317	.0 ² 307	.0 ² 298	.0 ² 289	.0 ² 280	.0 ² 272	.0 ² 264	1	2	3	4	5	6	7	8	9
2.8	.0 ² 256	.0 ² 248	.0 ² 240	.0 ² 233	.0 ² 226	.0 ² 219	.0 ² 212	.0 ² 205	.0 ² 199	.0 ² 193	1	1	2	3	4	4	5	6	6
2.9	.0 ² 187	.0 ² 181	.0 ² 175	.0 ² 169	.0 ² 164	.0 ² 159	.0 ² 154	.0 ² 149	.0 ² 144	.0 ² 139	0	1	1	2	2	3	3	4	4
3.0	.0 ² 135	.0 ² 131	.0 ² 126	.0 ² 122	.0 ² 118	.0 ² 114	.0 ² 111	.0 ² 107	.0 ² 104	.0 ² 100	0	1	1	2	2	2	3	3	4

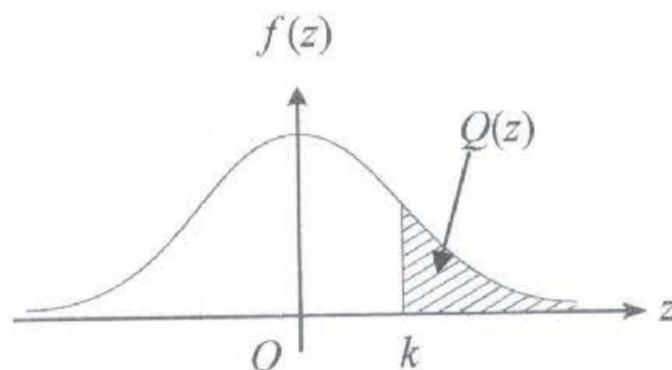
For negative z use relation:

Bagi z negatif guna hubungan:

$$Q(z) = 1 - Q(-z) = P(-z)$$

$$f(z) = \frac{1}{\sqrt{2\pi}} \exp\left(-\frac{1}{2}z^2\right)$$

$$Q(z) = \int_k^{\infty} f(z) dz$$



Example / Contoh :

If $X \sim N(0, 1)$, then

Jika $X \sim N(0, 1)$, maka

$$P(X > k) = Q(k)$$

$$P(X > 2.1) = Q(2.1) = 0.0179$$

9 Diberi bahawa persamaan suatu lengkung ialah $y = x^3(x^2 - 4)$.

TS
32 It is given that the equation of a curve is $y = x^3(x^2 - 4)$.

(a) Cari fungsi kecerunan bagi lengkung itu.

Find the gradient function of the curve,

[1 markah/mark]

(b) Cari koordinat titik pegun bagi lengkung itu. Seterusnya, tentukan sifat setiap titik pegun dengan menggunakan kaedah lakaran tangen.

Find the coordinates of the stationary points. Subsequently, determine the nature of stationary points by using the tangent sketching method.

[5 markah/marks]

(c) Jika tangen kepada lengkung pada titik A (2,0) dan tangen kepada lengkung pada titik P adalah selari, cari koordinat titik P.

If the tangents to the curve at point A (2,0) and a point P are parallel, find the coordinates of point P.

[4 markah/marks]

a) $y = x^3(x^2 - 4)$
 $y = x^5 - 4x^3$

$$\frac{dy}{dx} = 5x^4 - 12x^2$$

b) $\frac{dy}{dx} = 0$

$$5x^4 - 12x^2 = 0$$

$$x^2(5x^2 - 12) = 0$$

$$x^2 = 0 \quad \Rightarrow \quad x = 0$$

$$5x^2 - 12 = 0 \quad \Rightarrow \quad x^2 = \frac{12}{5} \quad \Rightarrow \quad x = \pm\sqrt{\frac{12}{5}}$$

$x=0, y=0$

$x = \sqrt{\frac{12}{5}}$

$x = -\sqrt{\frac{12}{5}}$

$y = \left(\sqrt{\frac{12}{5}}\right)^5 - 4\left(\sqrt{\frac{12}{5}}\right)^3$

$y = \left(-\sqrt{\frac{12}{5}}\right)^5 - 4\left(-\sqrt{\frac{12}{5}}\right)^3$

x	-0.1	0	0.1
$\frac{dy}{dx}$		0	
			$5x^4 - 12x^2$
			-0.1195

x	1.5	$\sqrt{\frac{12}{5}}$	1.6
$\frac{dy}{dx}$	-ve	0	+ve
			$5x^4 - 12x^2$
			-1.6875

x	-1.6	$-\sqrt{\frac{12}{5}}$	-1.5
$\frac{dy}{dx}$	+ve	0	-ve
			$5x^4 - 12x^2$
			2.048

$\frac{dy}{dx}$			$5x^4 - 12x^2$
			-0.1195

x	1.5	$\sqrt{\frac{12}{5}}$	1.6
$\frac{dy}{dx}$	-ve	0	+ve
			$5x^4 - 12x^2$
			-1.6875

x	-1.6	$-\sqrt{\frac{12}{5}}$	-1.5
$\frac{dy}{dx}$	+ve	0	-ve
			$5x^4 - 12x^2$
			2.048

(0,0), inflection point
 lengkok balas

$\left(\sqrt{\frac{12}{5}}, -5.949\right)$ local min

$\left(-\sqrt{\frac{12}{5}}, -5.949\right)$ local max

A(2,0)

$$y = x^5 - 4x^3$$

$$\frac{dy}{dx} = 5x^4 - 12x^2$$

$$(-2)^4 = 2^4$$

$$(-2)^2 = 2^2$$

$$\left. \frac{dy}{dx} \right|_{x=2} = 5(2)^4 - 12(2)^2$$
$$= 32$$

at P

$$5x^4 - 12x^2 = 32$$

$$\left. \frac{dy}{dx} \right|_{x=-2} = 5(-2)^4 - 12(-2)^2$$
$$= 32$$

let $y = x^2$ then $y^2 = x^4$

$$5y^2 - 12y - 32 = 0$$

$$(y - 4)(5y + 8) = 0$$

$$y = 4$$

$$y = -\frac{8}{5}$$

$$x^2 = 4$$

$$x^2 = -\frac{8}{5}$$

$$x = \pm\sqrt{4}$$
$$= \pm 2$$

(no sol)

at P, $x = -2$

$$y = (-2)^5 - 4(-2)^3$$
$$= 0$$

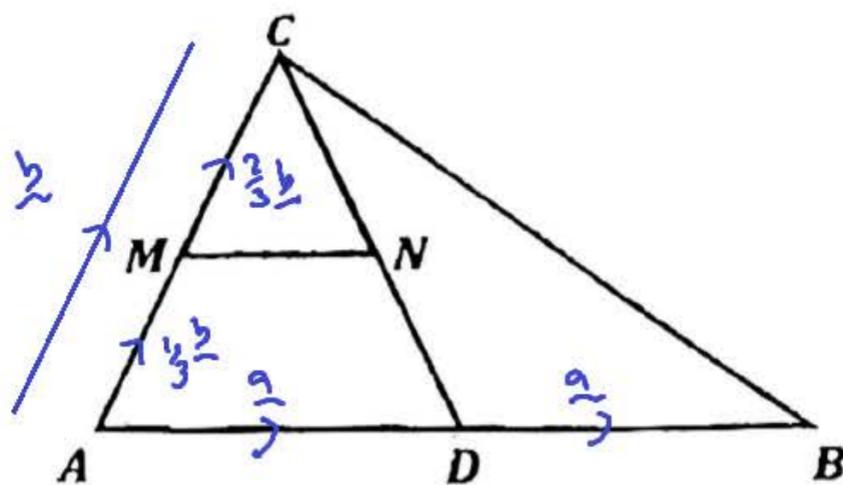
$(-2, 0)$

10 Rajah 4 di bawah menunjukkan sebuah segitiga ABC .

T4 Diagram 4 below shows a triangle ABC .

38 Diberi bahawa $\overrightarrow{AD} = \underline{a}$ dan $\overrightarrow{AC} = \underline{b}$, D ialah titik tengah AB .

It is given that $\overrightarrow{AD} = \underline{a}$ and $\overrightarrow{AC} = \underline{b}$, D is a midpoint of AB .



(a) Ungkapkan \overrightarrow{CD} dalam sebutan \underline{a} dan \underline{b} .

Express \overrightarrow{CD} in terms of \underline{a} and \underline{b} .

(b) Diberi titik M dan N masing-masing terletak di atas garis AC dan CD , di mana $h\overrightarrow{CN} = \overrightarrow{CD}$ dan $\overrightarrow{AM} = \frac{1}{3}\overrightarrow{AC}$. Ungkapkan \overrightarrow{MN} dalam sebutan h , \underline{a} dan \underline{b} .

It is given that points M and N respectively lie on the lines AC and CD , where $h\overrightarrow{CN} = \overrightarrow{CD}$ and $\overrightarrow{AM} = \frac{1}{3}\overrightarrow{AC}$. Express \overrightarrow{MN} in terms of h , \underline{a} and \underline{b} .

(c) Jika MN selari dengan AD , cari nilai
If MN is parallel to AD , find the value

(i) h ,

(ii) $MN:AD$,

(iii) $\frac{\text{luas segitiga CMN}}{\text{luas segitiga CAD}}$ dan $\frac{\text{luas segitiga CMN}}{\text{luas segitiga CAB}}$
 $\frac{\text{area of triangle CMN}}{\text{area of triangle CAD}}$ and $\frac{\text{area of triangle CMN}}{\text{area of triangle CAB}}$

[10 markah/marks]

$$\begin{aligned} \text{a) } \overrightarrow{CD} &= \overrightarrow{CA} + \overrightarrow{AD} \\ &= -\underline{b} + \underline{a} \end{aligned}$$

$$\begin{aligned} \text{b) } h\overrightarrow{CN} &= \overrightarrow{CD} \\ \overrightarrow{CN} &= \frac{1}{h}\overrightarrow{CD} \\ &= \frac{1}{h}(-\underline{b} + \underline{a}) \\ \overrightarrow{CN} &= \frac{1}{h}\underline{a} - \frac{1}{h}\underline{b} \end{aligned}$$

$$\begin{aligned} \overrightarrow{AM} &= \frac{1}{3}\overrightarrow{AC} = \frac{1}{3}\underline{b} \\ \overrightarrow{MC} &= \frac{2}{3}\underline{b} \\ \overrightarrow{MN} &= \overrightarrow{MC} + \overrightarrow{CN} \\ &= \frac{2}{3}\underline{b} + \frac{1}{h}\underline{a} - \frac{1}{h}\underline{b} \\ &= \frac{1}{h}\underline{a} + \left(\frac{2}{3} - \frac{1}{h}\right)\underline{b} \end{aligned}$$

$$(i) \vec{MN} = \lambda \vec{AD} \\ = \lambda a$$

$$\vec{MN} = \frac{1}{h} a + \left(\frac{2}{3} - \frac{1}{h}\right) b \\ \lambda a + 0b = \frac{1}{h} a + \left(\frac{2}{3} - \frac{1}{h}\right) b$$

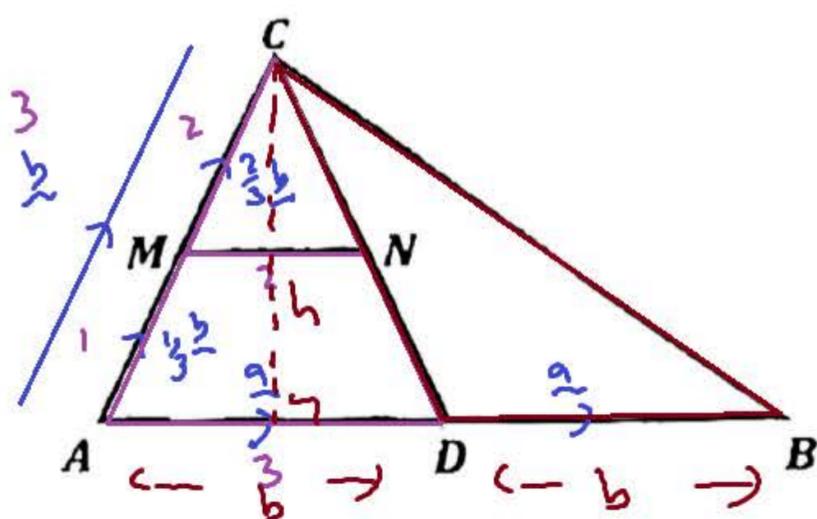
$$\frac{2}{3} - \frac{1}{h} = 0$$

$$\lambda = \frac{1}{h} \\ = \frac{1}{\frac{3}{2}} \\ = \frac{2}{3}$$

$$\frac{1}{h} = \frac{2}{3} \\ h = \frac{3}{2}$$

$$(ii) \vec{MN} = \frac{2}{3} \vec{AD} \\ \frac{\vec{MN}}{\vec{AD}} = \frac{2}{3}$$

$$MN : AD = 2 : 3$$



$$A_{CAD} = A_{BCD}$$

$$A_{CAD} = 2 A_{CBD}$$

$$\frac{A_{CMN}}{A_{CAD}} = \frac{A_{CMN}}{2(A_{CAD})} = \frac{4}{2(9)} = \frac{2}{9}$$

$$\frac{\text{luas segitiga CMN}}{\text{luas segitiga CAB}} = \frac{2}{9}$$

$$\frac{\text{luas segitiga CMN}}{\text{luas segitiga CAD}} \text{ dan } \frac{\text{luas segitiga CMN}}{\text{luas segitiga CAB}}$$

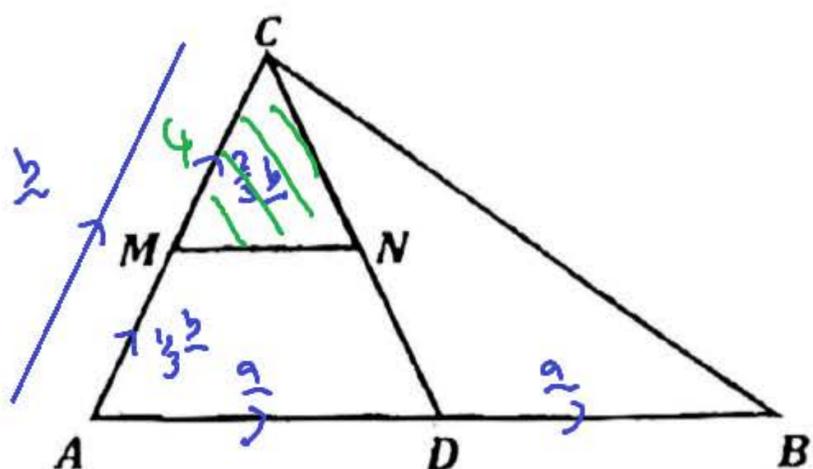
$$A_{\Sigma} = k^2 \times A_0$$

$$k = \frac{2}{3}$$

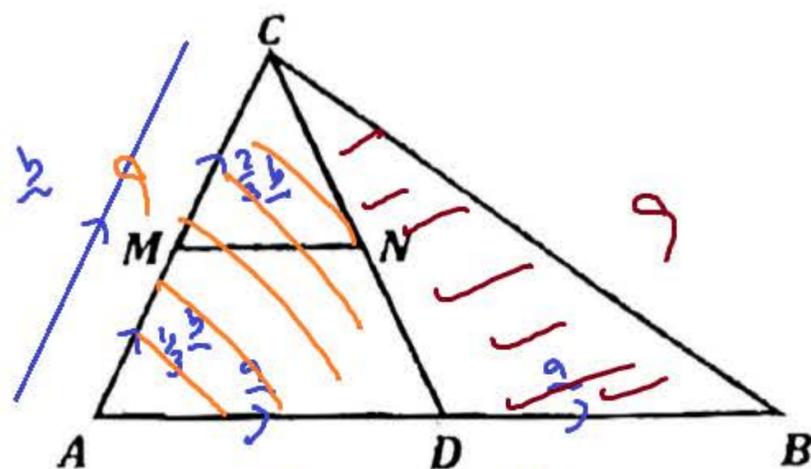
$$A_{CMN} = k^2 \times A_{CAD}$$

$$\frac{A_{CMN}}{A_{CAD}} = \left(\frac{2}{3}\right)^2 = \frac{4}{9}$$

$$\frac{\text{luas segitiga CMN}}{\text{luas segitiga CAD}} = \frac{4}{9}$$



$$\frac{A_{CMN}}{A_{CAD}} = \frac{4}{9+9} = \frac{4}{18} = \frac{2}{9}$$



same base
same height
= same Area

4

11 Gunakan kertas graf untuk menjawab soalan ini.

Use a graph paper to answer this question.

T4

B6

Jadual 2 menunjukkan nilai-nilai bagi dua pemboleh ubah, x dan y , yang dihubungkan oleh

persamaan $\frac{1}{y} = \sqrt{\frac{x+s}{r}}$, dengan keadaan r dan s adalah pemalar.

Table 2 shows the values of two variables, x and y which are related by the equation

$\frac{1}{y} = \sqrt{\frac{x+s}{r}}$, where r and s are constants

x	0.1	0.3	0.4	0.5	0.7	0.8
y	0.78	0.60	0.54	0.50	0.44	0.42

Jadual 2 / Table 2

(a) Plot $\frac{1}{y^2}$ lawan x , dengan menggunakan skala 2 cm kepada 0.1 unit pada paksi- x dan 2 cm kepada 0.5 unit pada paksi $\frac{1}{y^2}$. Seterusnya lukis garis lurus penyuaian terbaik.

Plot $\frac{1}{y^2}$ against x , using a scale 2 cm to 0.1 unit on the x -axis and 2 cm to 0.5 unit on the $\frac{1}{y^2}$ -axis. Hence, draw the line of the best fit.

(b) Gunakan graf anda di (a) untuk mencari nilai

Use your graph in (a) to find the value of

(i) r ,

(ii) s ,

(iii) x apabila $y = 0.70$.

x when $y = 0.70$.

(c) Cari nilai y apabila $x = 0.6$.

Find the value of y if $x = 0.6$.

[10 markah/mark]

$$\left(\frac{1}{y}\right)^2 = \sqrt{\frac{x+s}{r}}^2$$

$$\frac{1}{y^2} = \frac{x}{r} + \frac{s}{r}$$

$$\frac{1}{y^2} = \frac{1}{r}(x) + \frac{s}{r}$$

$$Y = mX + c$$

$$(0.76, 3.5), (0, 1.05)$$

(i)

$$m = \frac{3.5 - 1.05}{0.76 - 0}$$

$$\frac{1}{r} = \frac{5.5 - 1.05}{0.76}$$

$$r = \frac{1}{5.855}$$

$$= 0.1708$$

$$(ii) \frac{s}{r} = 1.05$$

$$s = 1.05 \times 0.1708$$

$$= 0.1793$$

$$\text{Ans} \times 1.05$$

$$0.1793258427$$

(iii)

$$Y = 5.855X + 1.05$$

$$\frac{1}{y^2} = 5.855(0.6) + 1.05$$

$$= 4.563$$

$$y^2 = \frac{1}{4.563}$$

$$= \frac{1}{4.563}$$

$$= 0.2191540653$$

$$(c) x = 0.6$$

$$\frac{1}{y^2} = 4.55$$

$$y^2 = \frac{1}{4.55}$$

$$0.2197802198$$

$$y = \sqrt{0.21978}$$

$$= 0.4688$$

$$\text{Ans}$$

$$0.468138938$$

$$y = \sqrt{0.2192}$$

$$= 0.4681$$

$$(iii) y = 0.7$$

$$\frac{1}{y^2} = \frac{1}{0.7^2}$$

$$2.040816327$$

$$x = 0.17$$

$$\text{Ans}$$

$$0.4688072309$$

x	0.1	0.3	0.4	0.5	0.7	0.8
y	0.78	0.60	0.54	0.50	0.44	0.42

1.64 2.78 3.43 4.00 3.17 5.67

skala 2 cm kepada 0.1 unit pada paksi-x dan
2 cm kepada 0.5 unit pada paksi $\frac{1}{y^2}$

$\frac{1}{x^2}$
1.64365549

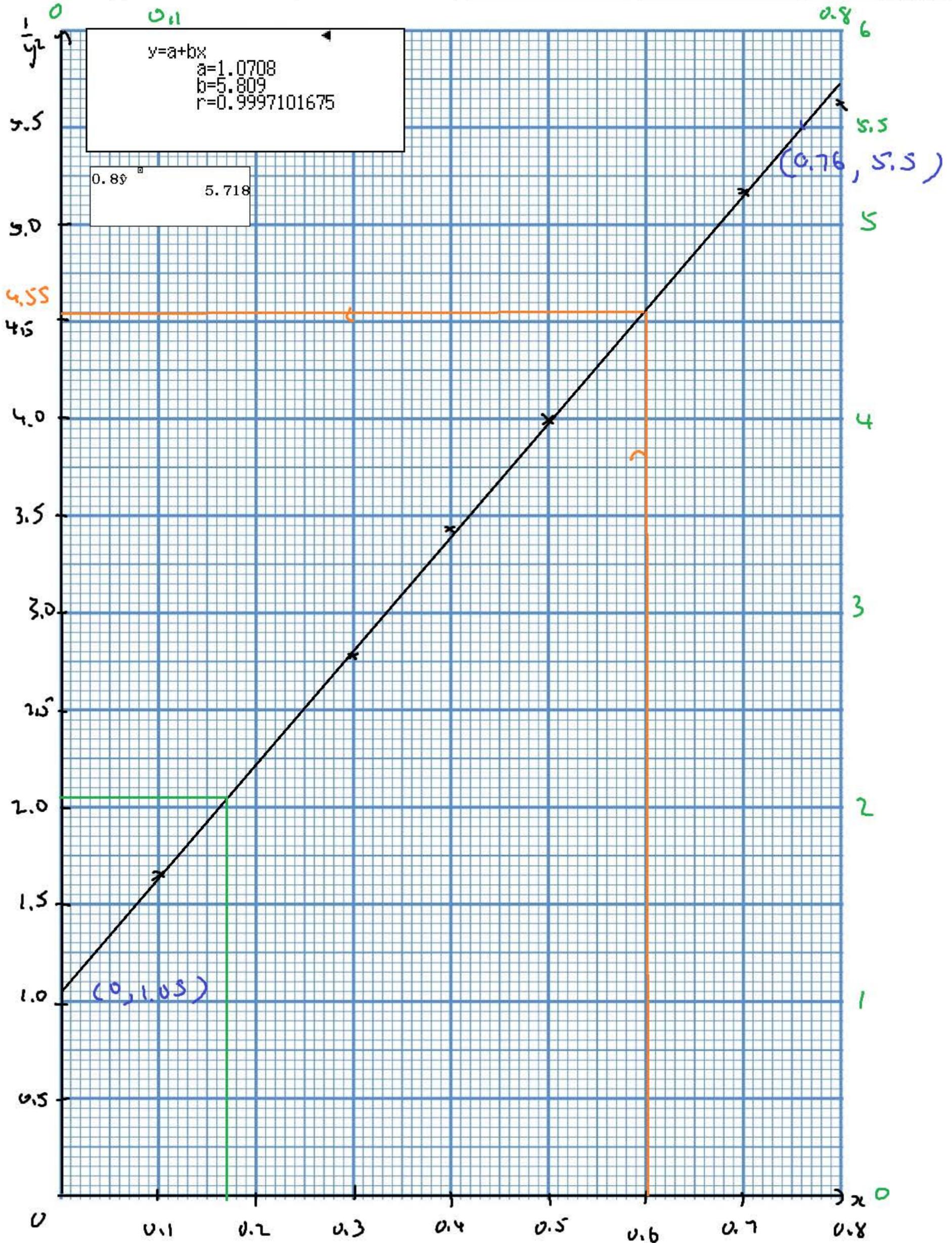
$\frac{1}{x^2}$
2.777777778

$\frac{1}{x^2}$
3.429355281

$\frac{1}{x^2}$
4

$\frac{1}{x^2}$
5.165289256

$\frac{1}{x^2}$
5.66893424



- 12 Jadual 3 di bawah menunjukkan indeks harga dan pemberat bagi empat bahan mentah P, Q, R dan S.
 74
 BIO
 Table 3 below shows the price indices and the weightages of four raw materials P, Q, R and S.

Bahan mentah Raw Material	Harga (RM) Price (RM)		Indeks harga pada tahun 2023 berdasarkan tahun 2020 Price index in the year 2023 based on the year 2020	Pemberat Weightage
	2020	2023		
P	$x(5)$	8.00	160	5
Q	5.00	6.50	130	7
R	10.00	8.50	$y(85)$	3
S	8.50	$z(1360)$	160	2

(a) Cari
Find

- (i) nilai-nilai x , y dan z ,
the values of x , y and z ,
- (ii) indeks gubahan bagi harga bahan mentah bagi tahun 2023 berasaskan tahun 2020.
the composite index for the prices of the raw materials in 2023 based on the year 2020.

[5 markah/marks]

(b) Perbelanjaan bulanan untuk bahan mentah pada tahun 2020 ialah RM506. Hitungkan perbelanjaan bulanan yang sepadan pada tahun 2023.

The monthly expenditure for the raw materials in the year 2020 was RM506. Calculate the corresponding monthly expenditure in the year 2023.

[2 markah/marks]

(c) Kos bahan mentah dijangka meningkat sebanyak 10% dari tahun 2023 hingga tahun 2025.

Cari indeks gubahan pada tahun 2025 berdasarkan tahun 2020.

The cost of raw materials is expected to increase by 10% from the year 2023 to the year 2025.

Find the composite index in the year 2025 based on the year 2020.

[3 markah/marks]

$$a) \frac{8}{x} \times 100 = 160$$

$$x = \frac{8 \times 100}{160}$$

em
= 5

$$\frac{8.5}{y} \times 100 = y$$

$$y = 85$$

$$\frac{z}{8.5} \times 100 = 160$$

$$z = \frac{160 \times 8.5}{100}$$

em
= 13.60

(ii)

I	W
160	5
130	7
y (85)	3
160	2

Ans: 17

134.4117647

$$\bar{I} = \frac{\sum Iw}{\sum w}$$

$$= \frac{160(5) + 130(7) + 85(3) + 160(2)}{5 + 7 + 3 + 2}$$

$$= \frac{2285}{17}$$

$$= 134.4$$

b) $P_{20} = 506$

$$\frac{P_{23}}{506} \times 100 = 134.4$$

$$P_{23} = \frac{134.4 \times 506}{100}$$

= RM 680.06

134.4 × 506 ÷ 100

680.064

c) $I_{25/23} = 110$

$$I_{25/20} = \frac{134.4 \times 110}{100}$$

$$= 147.8$$

	23	25
20	134.4	?
23	100	110

13 Gunakan kertas graf untuk menyelesaikan soalan berikut.

Use the graph paper to solve this question.

15
37

Pn. Arleena ingin menganjurkan satu rombongan dari kampungnya ke Melaka dengan menaiki bas. Peserta rombongan itu terdiri daripada x dewasa dan y kanak-kanak. Setiap dewasa membayar tambang RM50.00 dan setiap kanak-kanak membayar tambang RM25.00.

Madam Arleena wants to organize a bus trip from her village to Melaka. The participants of the trip consisted of x adults and y children. Each adult pay a fare of RM50.00 and each child pays a fare of RM25.00.

Penganjuran rombongan ini adalah berdasarkan kekangan berikut.

The organization of this trip is based on the following constraints.

- I. Bas tersebut boleh memuatkan sehingga 42 penumpang sahaja.
The bus can accommodate up to 42 passengers only.
- II. Bilangan penumpang dewasa mestilah tidak lebih daripada dua kali ganda bilangan kanak-kanak.
The number of adult passengers is not more than twice the number of children.
- III. **Tambang yang dikutip mesti lebih daripada RM 350.**

(a) Tulis tiga ketaksamaan, selain $x \geq 0$ dan $y \geq 0$, yang memenuhi semua kekangan di atas.
Write down three inequalities, other than $x \geq 0$ and $y \geq 0$, which satisfy all the above constraint.

[3 markah/marks]

(b) Menggunakan skala 2 cm kepada 5 peserta pada kedua-dua paksi, bina dan lorek rantau R yang memenuhi semua kekangan di atas.
By using a scale of 2 cm to 5 participants on both axes, construct and shade the region R that satisfies all the above constraints.

[3 markah/marks]

(c) Dengan menggunakan graf anda di 13(b), cari
By using your graph from 13(b), find

(i) bilangan minimum peserta dalam rombongan itu jika terdapat empat peserta dewasa sahaja,
the minimum number of participants in this trip if there are only four adult participants.

(ii) jumlah maksimum yang dikutip daripada tambang peserta.
the maximum amount collected from the fare of the participants.

[4 markah/marks]

$$(i) x + y \leq 42$$

$$(ii) x \leq 2y$$

$$(iii) 50x + 25y > 350$$

$$(c)(i) x = 4$$

$$\min y = 7$$

$$\min \text{jumlah} = 4 + 7 = 11$$

$$(ii) (28, 14)$$

$28 \times 50 + 14 \times 25$
1750

$$\begin{aligned} \text{jumlah maksimum} &= 28(50) + 14(25) \\ &= \text{RM } 1750 \end{aligned}$$

4

(i) $x + y \leq 42$

$x = y, y = 42$

$x = 40, y = 42 - 40 = 2$

(ii) $x \leq 2y$

$x = 0, y = 0$

$x = 40, y = \frac{40}{2} = 20$



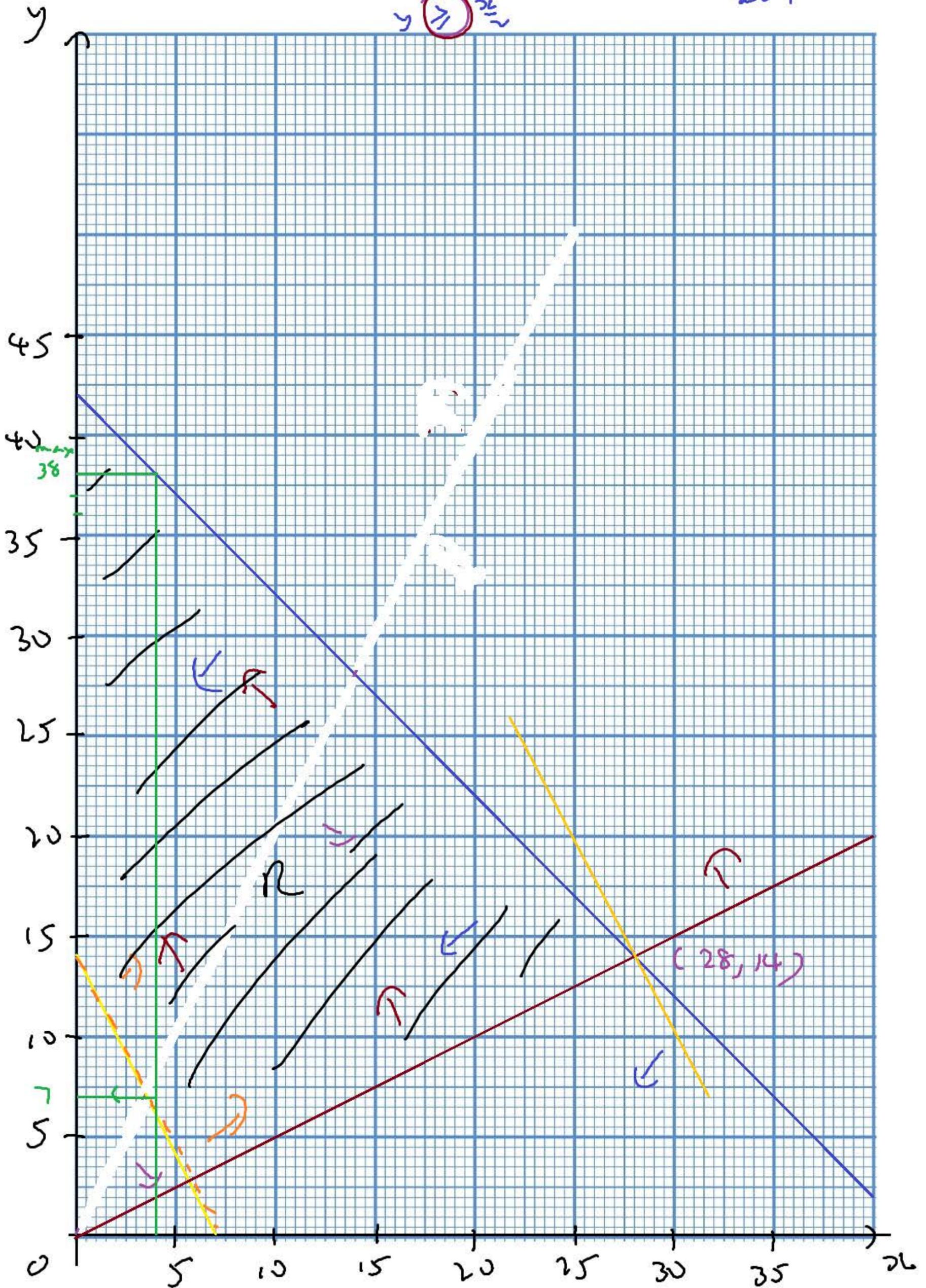
(iii) $50x + 25y > 350$

$2x + y > 14$

$x = 0, y = 14$

$y = 0, 2x = 14$

$x = 7$



14
75
38

Suatu zarah bergerak di sepanjang garis lurus melalui suatu titik tetap O dengan halajunya, 36 ms^{-1} . Pecutan, $a \text{ ms}^{-2}$, diberi oleh $a = 14 - 4t$ dengan keadaan t ialah masa, dalam saat, selepas melalui O . Zarah berhenti bergerak selepas k saat.

A particle moves along a straight line through a fixed point O with its velocity of 36 ms^{-1} . Its acceleration, $a \text{ ms}^{-2}$, is given by $a = 14 - 4t$ such that t is the time, in seconds, after passing through O . The particle stops moving after k seconds.

[Anggapkan gerakan ke kanan adalah positif.]

[Assume motion to the right is positive.]

(a) Cari

Find

(i) halaju maksimum zarah itu,
the maximum velocity of the particle,

(ii) nilai k .
the value of k .

[6 markah/marks]

(b) Lakarkan graf halaju-masa untuk $0 \leq t \leq k$. Seterusnya, cari jumlah jarak yang dilalui oleh zarah tersebut.

Sketch the velocity-time graph for $0 \leq t \leq k$. Hence, find the total distance travelled by the particle.

[4 markah/marks]

$$t=0, s=0, v=36$$

$$a = 14 - 4t$$

$$v = \int (14 - 4t) dt$$

$$= 14t - 2t^2 + c$$

$$t=0, v=36 \Rightarrow c=36$$

$$v = 14t - 2t^2 + 36$$

(i) halaju maksimum semasa

$$14 - 4t = 0$$

$$4t = 14$$

$$t = \frac{14}{4} = \frac{7}{2}$$

$$= 3.5$$

$$a=0$$

$$v = 14(3.5) - 2(3.5)^2 + 36$$

$$= 60.5 \text{ m/s}$$

(ii) $t=k, v=0$

$$14t - 2t^2 + 36 = 0$$

$$7t - t^2 + 18 = 0$$

$$t^2 - 7t - 18 = 0$$

$$(t + 2)(t - 9) = 0$$

$$t = -2$$

(rejected)

$$t = 9$$

$$\therefore k=9$$

$$(b) v = 14t - 2t^2 + 36$$

$$t=9, v=0$$

$$t=3.5, v=60.5 \text{ (max)}$$

$$t=0, v=36$$

$$s = \int_0^9 v dt$$

$$= \int_0^9 (14t - 2t^2 + 36) dt$$

$$= \left[7t^2 - \frac{2t^3}{3} + 36t \right]_0^9$$

$$= \left[7(9)^2 - \frac{2}{3}(9)^3 + 36(9) \right] - [0 - 0 + 0]$$

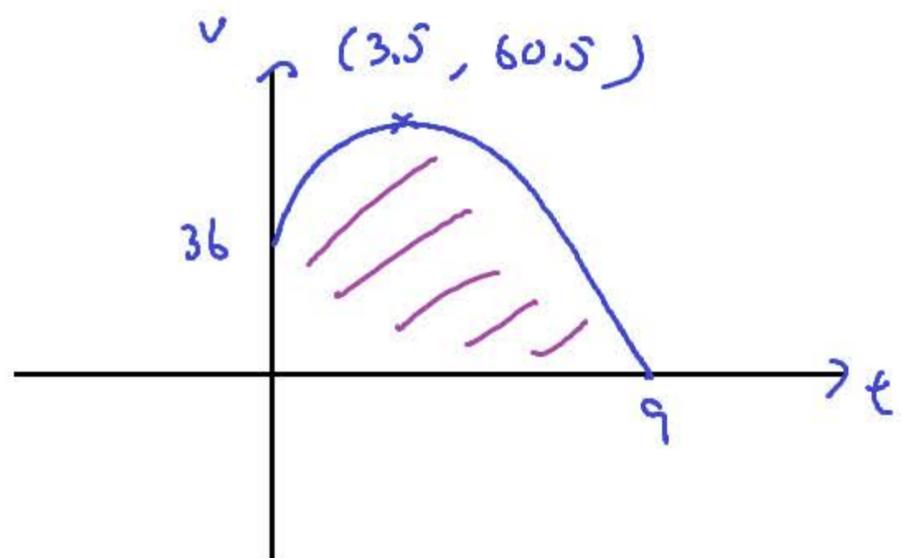
$$= 405 \text{ m}$$

$$s = \int (14t - 2t^2 + 36) dt$$

$$= 7t^2 - \frac{2t^3}{3} + 36t + k$$

$$t=0, s=0 \Rightarrow k=0$$

$$\therefore s = 7t^2 - \frac{2}{3}t^3 + 36t$$



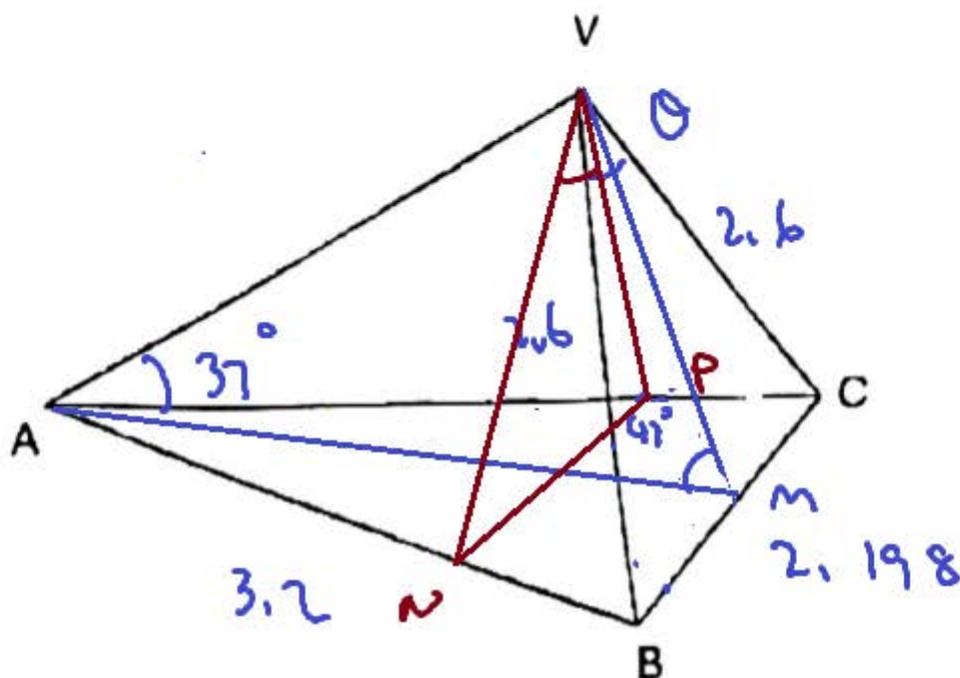
$$\int_0^9 14x - 2x^2 + 36 dx$$

405

15 Rajah 5 menunjukkan sebuah khemah VABC dalam bentuk piramid dengan segi tiga ABC sebagai tapak mengufuk. V ialah bucu khemah dan sudut di antara satah condong VBC dengan tapak ialah 42° .

T4
B9

Diagram 5 shows a tent VABC in the shape of a pyramid with triangle ABC as the horizontal base. V is the vertex of the tent and the angle between the inclined plane VBC and the base is 42° .



$$AB = AC = 3.2 \text{ m,}$$

$$\rightarrow AC = 3.2$$

Diberi bahawa $VB = VC = 2.6 \text{ m}$ dan $AB = 3.2 \text{ m}$, hitung

Given that $VB = VC = 2.6 \text{ m}$ and $AB = 3.2 \text{ m}$, calculate

- (a) panjang BC jika luas segi tiga ialah 2.5893 m^2 ,
the length of BC if the area of the triangle VBC is 2.5893 m^2 ,

[2 markah/marks]

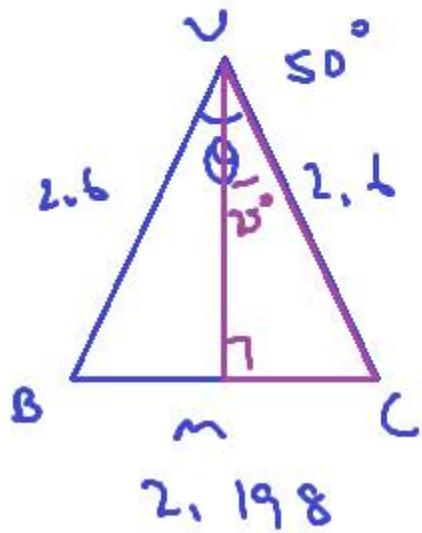
- (b) panjang AV jika sudut di antara garis lurus AV dan tapak ialah 37° ,
the length of AV if the angle between the straight line AV and the base is 37° ,

[3 markah/marks]

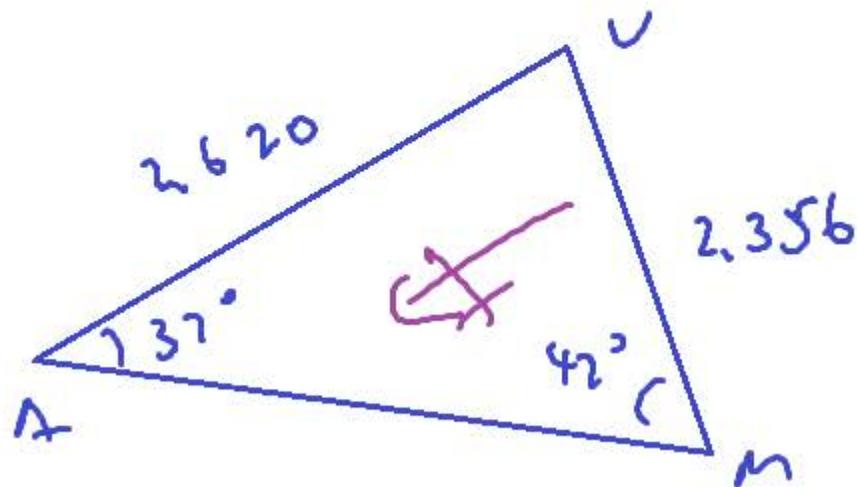
- (c) sudut di antara dua satah condong VAB dan VAC.
the angle between the two incline planes VAB and VAC.

[5 markah/marks]

$$A_{ABC} = 2.5893$$



$$VM = \sqrt{2.6^2 - 1.0988^2} = 2.356403735$$



$$\frac{1}{2} (2.6)(2.6) \sin \theta = 2.5893$$

$$\sin \theta = \frac{2.5893 \times 2}{2.6^2} = 0.7660650888$$

$$BC^2 = 2.6^2 + 2.6^2 - 2 \times 2.6 \times 2.6 \times \sin \theta = 4.829511517$$

$$\theta = \sin^{-1}(\text{Ans}) = 50.00184031$$

$$BC = \sqrt{\text{Ans}} = 2.197614961$$

$$\sin 25^\circ = \frac{MC}{2.6}$$

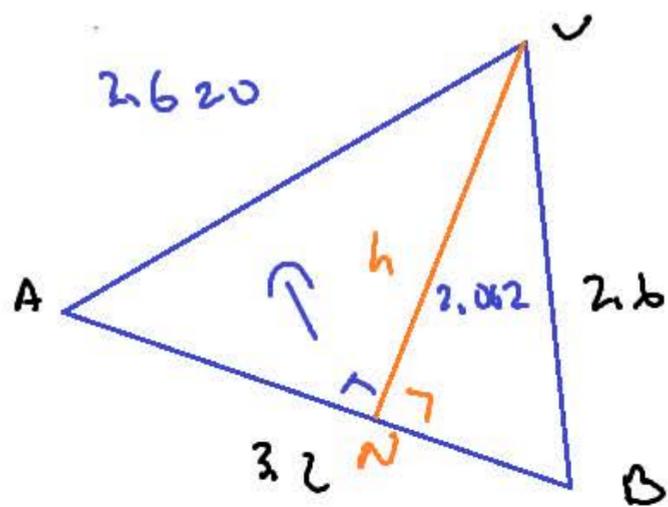
$$MC = 2.6 \sin(25) = 1.098807481$$

$$BC = 2MC = \text{Ans} \times 2 = 2.197614961$$

$$\frac{AV}{\sin 42^\circ} = \frac{2.356}{\sin 37^\circ}$$

$$AV = \frac{2.356 \sin(42)}{\sin(37)} = 2.619528672$$

$$= 2.620$$



$$s = \frac{2.62 + 2.6 + 3.2}{2} = 4.21$$

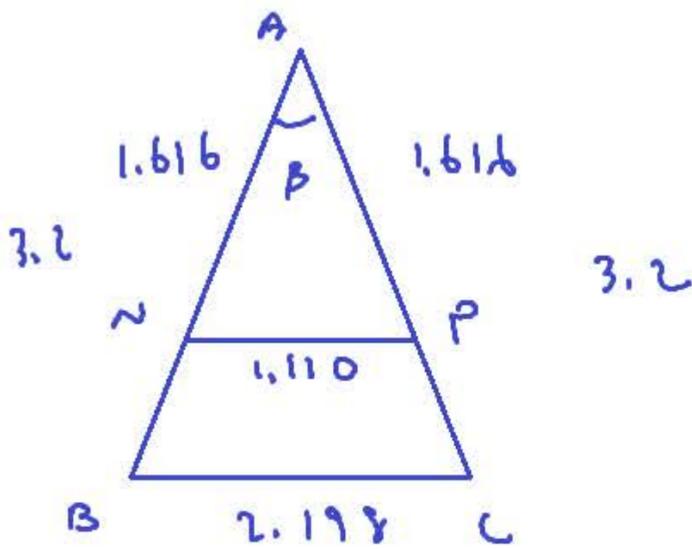
$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$\frac{1}{2}(3.2)h = \sqrt{\text{Ans}(\text{Ans}-2.62)(\text{Ans}-2.6)(\text{Ans}-3.2)}$$

$$h = \frac{\text{Ans} \times 2}{3.2} = 2.0620218$$

$$VN = VP = 2.062$$

$$AN = \sqrt{2.62^2 - 2.062^2} = 1.616340311$$



$$2.198^2 = 3.2^2 + 3.2^2 - 2(3.2)(3.2)\cos\beta$$

$$\cos\beta = \frac{3.2^2 + 3.2^2 - 2.198^2}{2(3.2)^2}$$

$$\frac{3.2^2 + 3.2^2 - 2.198^2}{2 \times 3.2^2} = 0.7641013672$$

$$\beta = 40.17$$

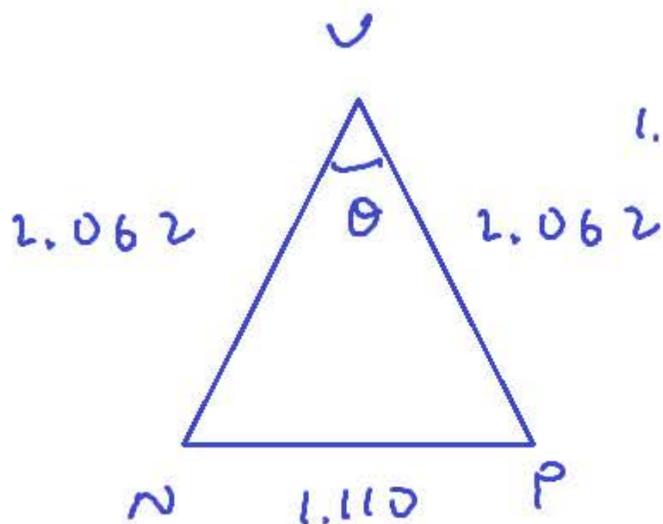
$$\cos^{-1}(\text{Ans}) = 40.17288821$$

$$NP^2 = 1.616^2 + 1.616^2 - 2(1.616)(1.616)\cos 40.17$$

$$= \frac{1.616^2 \times 2 - 2 \times 1.616^2 \times \cos 40.17}{2}$$

$$NP = \sqrt{\text{Ans}} = 1.109913494$$

$$= 1.110$$



$$1.11^2 = 2.062^2 + 2.062^2 - 2(2.062)(2.062)\cos\theta$$

$$\cos\theta = \frac{2.062^2 + 2.062^2 - 1.11^2}{2(2.062)^2}$$

$$= \frac{2.062^2 \times 2 - 1.11^2}{2 \times 2.062^2} = 0.8551099241$$

$$\theta = \cos^{-1}(0.8551)$$

$$= 31.23^\circ$$

$$\cos^{-1}(\text{Ans}) = 31.22811916$$