Jawapan

Pentaksiran Sumatif

Kertas 1

1 (a) Bukan fungsi, hubungan banyak kepada satu.
Not a function, many-to-one relation.

(b) $h(x) = x$

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

$$2x + 3 = 5x$$

$$3x = 3$$

$$x = 1$$

2 (a) $y = 9 - (x + h)^2$

$y_{\max} = 9$ apabila/*when* $x = -h$

Paksi simetri/*Axis of symmetry*:

$$x = \frac{1+7}{2}$$

$$x = 4$$

$$-h = 4$$

$$h = -4$$

$y = 9 - (x - 4)^2$

Gantikan/*Substitute* $(0, k)$, $k = 9 - (0 - 4)^2$

$k = -7$

(b) $px(px + 2) = 3x - 1$

$p^2x^2 + 2px - 3x + 1 = 0$

$p^2x^2 + (2p - 3)x + 1 = 0$

$(2p - 3)^2 - 4(p^2)(1) < 0 \quad [b^2 - 4ac < 0]$

$4p^2 - 12p + 9 - 4p^2 < 0$

$12p > 9$

$p > \frac{3}{4}$

3 (a) $4x + 5y = 24$

Pada paksi-x/*At x-axis*, $y = 0$,

$4x = 24$

$x = 6$

$\therefore$ Koordinat/*Coordinates of* $D = (6, 0)$

(b) $5y = -4x + 24$

$$y = -\frac{4}{5}x + \frac{24}{5}$$

$$m_{CD} = -\frac{4}{5}$$

$$-\frac{4}{5}m_2 = -1$$

$$m_2 = \frac{5}{4}$$

$$y - 0 = \frac{5}{4}(x - 6)$$

$$y = \frac{5}{4}x - \frac{15}{2}$$

4 $\overrightarrow{PR} = \overrightarrow{PQ} + \overrightarrow{ST}$

$= h\underset{\sim}{x} + 5\underset{\sim}{y} - (3\underset{\sim}{x} + 2h\underset{\sim}{y})$

$= (h - 3)\underset{\sim}{x} + (5 - 2h)\underset{\sim}{y}$

$\overrightarrow{PR} = \lambda\overrightarrow{ST}$

$(h - 3)\underset{\sim}{x} + (5 - 2h)\underset{\sim}{y} = \lambda(9\underset{\sim}{x} - 12\underset{\sim}{y})$

$(h - 3)\underset{\sim}{x} + (5 - 2h)\underset{\sim}{y} = 9\lambda\underset{\sim}{x} - 12\lambda\underset{\sim}{y}$

$h - 3 = 9\lambda$ … ①

$5 - 2h = -12\lambda$ … ②

$\frac{①}{②}$: $\frac{h-3}{5-2h} = -\frac{9}{12}$

$4h - 12 = 6h - 15$

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

5 (a) $(2x - 1)^2 = 5 - 3x$

$4x^2 - 4x + 1 = 5 - 3x$

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

$$x = \frac{-(-1) \pm \sqrt{(-1)^2 - 4(4)(-4)}}{2(4)}$$

$$= \frac{1 \pm \sqrt{65}}{2(4)}$$

$\therefore x = -0.883, 1.133$

(b) $f(x) = x^2 - 4px + 3p^2$

$f(x) = (x - 2p)^2 - 4p^2 + 3p^2$

$f(x) = (x - 2p)^2 - p^2$

6 (a) $T_2 - T_1 = T_3 - T_2$

$3q - p = p + 4 - 3q$

$6q = 2p + 4$

$q = \frac{p+2}{3}$

(b) $\frac{36}{k} = \frac{24}{36}$

$k = 54$

$r = \frac{24}{36}$

$= \frac{2}{3}$

$S = \frac{54}{1 - \frac{2}{3}}$

$S = 162$

7 (a) (i) $y = |a - 3x|$

Gantikan/*Substitute* $(0, 4)$,

$4 = |a - 3(0)|$

$|a| = 4$

$a = 4$

(ii) Gantikan/*Substitute* $(b, 0)$,

$0 = |4 - 3b|$

$4 - 3b = 0$

$b = \frac{4}{3}$

(iii) Gantikan/*Substitute* $(4, c)$, $c = |4 - 3(4)|$

$c = 8$

(b) $f^{-1}(3) = y$

$f(y) = 3$

$5y + h = 3$

$y = \frac{3 - h}{5}$

$f^{-1}(3) = \frac{3 - h}{5}$

$gf^{-1}(3) = 7$

$g\left(\frac{3 - h}{5}\right) = 7$

$\frac{k}{\frac{3 - h}{5}} + 3 = 7$

$\frac{5k}{3 - h} = 4$

$\frac{5}{4}k = 3 - h$

$h = 3 - \frac{5}{4}k$

8 (a) $3^{n+2} - 3^{n+1} + 3^n = k(3^n)$

$3^{n+2} - 3^{n+1} + 3^n = 3^n \times 3^2 - 3^n \times 3 + 3^n \times 1$

$= 3^n(3^2 - 3 + 1)$

$= 3^n(7)$

$\therefore k = 7$

(b) $4 \log_x 2 - 2 \log_x 5 = 3 + \log_x 10$

$\log_x 2^4 - \log_x 5^2 = 3 \log_x x + \log_x 10$

$\log_x 16 - \log_x 25 = \log_x x^3 + \log_x 10$

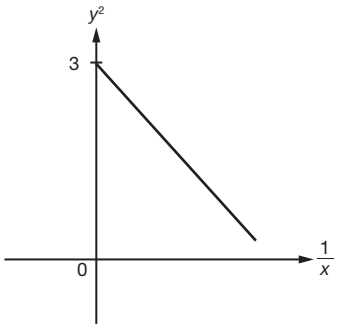
$\log_x \frac{16}{25} = \log_x 10x^3$

$\frac{16}{25} = 10x^3$

$x^3 = \frac{8}{125}$

$x = \frac{2}{5}$

9 (a) $y^2 = \frac{6x - 1}{2x}$



(b) $\log_2 y = \log_2 k\sqrt{2^x}$

$\log_2 y = \log_2 k + \log_2 2^{\frac{1}{2}x}$

$= \frac{1}{2}x \log_2 2 + \log_2 k$

$= \frac{1}{2}x + \log_2 k$

$\frac{5 - 2}{h + 2} = \frac{1}{2}$

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

$h + 2 = 6$

$h = 4$

atau/*or*

$Y = \frac{1}{2}X + \log_2 k$

Gantikan/*Substitute* (−2, 2),

$2 = \frac{1}{2}(-2) + \log_2 k$

$\log_2 k = 3$

$k = 2^3$

$k = 8$

10 (a) $\overrightarrow{BA} = \overrightarrow{OA} - \overrightarrow{OB}$

$= -3\underset{\sim}{i} + 4\underset{\sim}{j} - (5\underset{\sim}{i} + \underset{\sim}{j})$

$= -8\underset{\sim}{i} + 3\underset{\sim}{j}$

$|\underset{\sim}{p}| = \sqrt{(-8)^2 + 3^2}$

$= \sqrt{73}$

$p = \frac{-8\underset{\sim}{i} + 3\underset{\sim}{j}}{\sqrt{73}}$

(b) (i) $\overrightarrow{UW} = \overrightarrow{OW} - \overrightarrow{OU}$

$= 3\underset{\sim}{w} - 2\underset{\sim}{u}$

(ii) $\overrightarrow{OX} = \overrightarrow{OU} + \overrightarrow{UX}$

$= 2\underset{\sim}{u} + \frac{1}{4}\overrightarrow{UW}$

$= 2\underset{\sim}{u} + \frac{1}{4}(3\underset{\sim}{w} + 2\underset{\sim}{u})$

$= 2\underset{\sim}{u} + \frac{1}{2}\underset{\sim}{u} + \frac{3}{4}\underset{\sim}{w}$

$= \frac{3}{2}\underset{\sim}{u} + \frac{3}{4}\underset{\sim}{w}$

11 (a) (i) $S_n = 42p + 14q$

$\frac{n}{2}[9p - 4q + 3p + 8q] = 42p + 14q$

$\frac{n}{2}[12p + 4q] = 42p + 14q$

$\frac{4n}{2}[3p + q] = 14(3p + q)$

$2n = 14$

$n = 7$

(ii) $T_7 = 3p + 8q$

$9p - 4q + 6d = 3p + 8q$

$6d = -6p + 12q$

$d = 2q - p$

(b) $S_2 = 15$

$\frac{a(r^2 - 1)}{r - 1} = 15 \ldots ①$

$S_4 = 255$

$\frac{a(r^4 - 1)}{r - 1} = 255 \ldots ②$

② ÷ ①:

$\frac{\frac{a(r^4 - 1)}{r - 1}}{\frac{a(r^2 - 1)}{r - 1}} = \frac{255}{15}$

$\frac{r^4 - 1}{r^2 - 1} = 17$

$$\frac{(r^2-1)(r^2+1)}{r^2-1} = 17$$
$$r^2 + 1 = 17$$
$$r^2 = 16$$
$$r = \pm 4$$
$r > 0$, $\therefore r = 4$

12 (a) $2x - 3px + q - 5 = 0$

Punca-punca/*Roots*: α, 2α

HTP/SOR: $\alpha + 2\alpha = -\dfrac{(-3p)}{2}$

$$3\alpha = \frac{3p}{2}$$
$$\alpha = \frac{1}{2}p$$

HDP/POR: $\alpha \times 2\alpha = \dfrac{q-5}{2}$

$$2\alpha^2 = \frac{q-5}{2}$$
$$2\left(\frac{1}{2}p\right)^2 = \frac{q-5}{2}$$
$$p^2 = q - 5$$
$$q = p^2 + 5$$

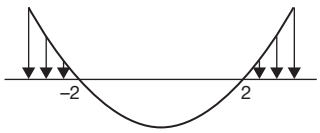
(b) $7 - 2x < (3x - 5)(x + 1)$

$7 - 2x < 3x^2 - 2x - 5$

$3x^2 - 12 > 0$

$x^2 - 4 > 0$

$(x + 2)(x - 2) > 0$



$\therefore x < -2, x > 2$

13 (a) $4x + y + z = 11$ … ①

$x - 3y + 2z = 5$ … ②

$3x + 4y - z = 7$ … ③

① + ③, $7x + 5y = 18$ … ④

① × 2, $8x + 2y + 2z = 22$ … ⑤

⑤ − ②, $7x + 5y = 17$ … ⑥

④ − ⑥, $0 = 1$

$\therefore$ Tiada penyelesaian/*No solution*

(b) $px + 2y = 8$

Gantikan/*Substitute* $(q, 6)$,

$pq + 2(6) = 8$

$pq = -4$ … ①

$y = 2x^2 - 3x + 4$

Gantikan/*Substitute* $(q, 6)$,

$2q^2 - 3q + 4 = 6$

$2q^2 - 3q - 2 = 0$

$(2q - 1)(q + 2) = 0$

$q = \dfrac{1}{2}, q = -2$

Gantikan ke dalam ①/*Substitute into* ①,

$q = \dfrac{1}{2}, p\left(\dfrac{1}{2}\right) = -4$

$p = -8$

$q = -2, p(-2) = -4$

$p = 2$

14 (a) $(3\sqrt{2} - 1)(\sqrt{2} + 2)h = 32 + 23\sqrt{2}$

$(3(2) + 6\sqrt{2} - \sqrt{2} - 2)h = 32 + 23\sqrt{2}$

$(4 + 5\sqrt{2})h = 32 + 23\sqrt{2}$

$$h = \frac{32 + 23\sqrt{2}}{4 + 5\sqrt{2}} \times \frac{4 - 5\sqrt{2}}{4 - 5\sqrt{2}}$$
$$h = \frac{128 - 160\sqrt{2} + 92\sqrt{2} - 115(2)}{16 - 25(2)}$$
$$h = \frac{-102 - 68\sqrt{2}}{-34}$$
$$h = 3 + 2\sqrt{2} \text{ cm}$$

(b) $\log_9 40 = \dfrac{\log_3 40}{\log_3 9}$

$$= \frac{3\log_3 2 + \log_3 5}{2\log_3 3}$$
$$r = \frac{3p + q}{2}$$
$$q = 2r - 3p$$

15 (a) $B(x, 2x)$

$$\frac{1}{2}\begin{vmatrix} 0 & 2 & x & 0 \\ 0 & -3 & 2x & 0 \end{vmatrix} = 14$$
$$4x + 3x = 28$$
$$7x = 28$$
$$x = 4$$
$$y = 2(4)$$
$$y = 8$$

$\therefore$ Koordinat/*Coordinates of* $B = (4, 8)$

(b) $\sqrt{(x-1)^2 + (y-2)^2} = \sqrt{(3-1)^2 + (-1-2)^2}$

$x^2 - 2x + 1 + y^2 - 4y + 4 = 13$

$x^2 + y^2 - 2x - 4y - 8 = 0$

Gantikan/*Substitute* $(-2, 4)$,

LHS $= (-2)^2 + 4^2 - 2(-2) - 4(4) - 8$

$= 4 + 16 + 4 - 16 - 8$

$= 0$

$= RHS$

Ya, dia akan melalui perhentian bas.

Yes, he will pass through the bus stop.

Kertas 2

1 $2y - x = 4y^2 - xy = 5$

$2y - x = 5$

$x = 2y - 5$ … ①

$4y^2 - xy = 5$ … ②

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

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

$4y^2 - 2y^2 + 5y = 5$

$2y^2 + 5y - 5 = 0$

$$y = \frac{-5 \pm \sqrt{5^2 - 4(2)(-5)}}{2(2)}$$

$\therefore y = -3.266, 0.766$

Gantikan ke dalam ①/*Substitute into* ①,

$y = -3.266, x = 2(-3.266) - 5$

$= -11.532$

$y = 0.766, x = 2(0.766) - 5$

$= -3.468$

2 (a) $f(x) = \dfrac{2x}{x+p}$, $x \neq -p$, $g(x) = x + 4$

$f^{-1}(x) = y$

$f(y) = x$

$\dfrac{2y}{y+p} = x$

$2y = xy + px$

$2y - xy = px$

$(2 - x)y = px$

$y = \dfrac{px}{2-x}$

$f^{-1}(x) = \dfrac{px}{2-x}$, $x \neq 2$

(b) $gf^{-1}(3) = k$

$g\left(\dfrac{3p}{2-3}\right) = k$

$g(-3p) = k$

$k = -3p + 4 \ldots$ ①

$fg(-3) = \dfrac{1}{k}$

$f(-3+4) = \dfrac{1}{k}$

$f(1) = \dfrac{1}{k}$

$\dfrac{2(1)}{1+p} = \dfrac{1}{k}$

$2k = 1 + p \ldots$ ②

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$2(-3p + 4) = 1 + p$

$-6p + 8 = 1 + p$

$7p = 7$

$p = 1$

Gantikan ke dalam ①/*Substitute into* ①,

$k = -3(1) + 4$

$k = 1$

3 $PU = \dfrac{3x - 2 - x}{2}$

$= x - 1$

$PQ = \sqrt{(2x)^2 + (x-1)^2}$

$= \sqrt{4x^2 + x^2 - 2x + 1}$

$= \sqrt{5x^2 - 2x + 1}$

$2\sqrt{5x^2 - 2x + 1} + x + 3x - 2 = 48$

$2\sqrt{5x^2 - 2x + 1} = 50 - 4x$

$\sqrt{5x^2 - 2x + 1} = 25 - 2x$

$5x^2 - 2x + 1 = (25 - 2x)^2$

$5x^2 - 2x + 1 = 625 - 100x + 4x^2$

$x^2 + 98x - 624 = 0$

$(x + 104)(x - 6) = 0$

$x > 0$, $\therefore x = 6$

$A = \dfrac{1}{2}(4(6) - 2) \times 2(6)$

$= 132 \text{ cm}^2$

4 (a) $|\underset{\sim}{y}| = 26$

$p\sqrt{12^2 + (-5)^2} = 26$

$13p = 26$

$p = 2$

(b) $\overrightarrow{OS} = \overrightarrow{OS} + t\underset{\sim}{v}$

$= -17\underset{\sim}{i} + 25\underset{\sim}{j} + t(24\underset{\sim}{i} - 10\underset{\sim}{j})$

$= (-17 + 24t)\underset{\sim}{i} + (25 - 10t)\underset{\sim}{j}$

(c) $\overrightarrow{OS} = \lambda\underset{\sim}{i}$

$(-17 + 24t)\underset{\sim}{i} + (25 - 10t)\underset{\sim}{j} = \lambda\underset{\sim}{i} + 0\underset{\sim}{j}$

Bandingkan/*Compare* $\underset{\sim}{j}$: $25 - 10t = 0$

$t = 2.5$

Bandingkan/*Compare* $\underset{\sim}{i}$: $-17 + 24(2.5) = \lambda$

$\lambda = 43$ km

5 (a) $f(x) = 3x^2 + 6x + 5$

$f(x) = 3(x^2 + 2x) + 5$

$= 3\left[x^2 + 2x + \left(\dfrac{2}{2}\right)^2 - \left(\dfrac{2}{2}\right)^2\right] + 5$

$= 3[(x+1)^2 - 1] + 5$

$= 3(x+1)^2 - 3 + 5$

$= 3(x+1)^2 + 2$

$f(x)_{\min} = 2$ apabila/*when* $x = -1$

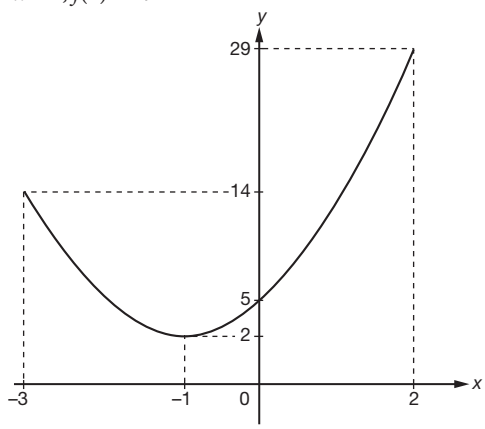
$\therefore$ Titik minimum/*Minimum point* $= (-1, 2)$

(b) Pada paksi-y/*At y-axis*, $x = 0$, $f(0) = 5$

Domain dan julat/*Domain and range*:

$x = -3$, $f(-3) = 14$

$x = 2$, $f(2) = 29$



(c) $3x^2 + 6x + 5 = 2k - 1$

$y = 2k - 1$ ialah suatu garis mengufuk.

$y = 2k - 1$ tidak memintas $y = 3x^2 + 6x + 5$ apabila $2k - 1 < 2$.

Maka, $k < \dfrac{3}{2}$.

$y = 2k - 1$ *is a horizontal line.*

$y = 2k - 1$ *does not intercept* $y = 3x^2 + 6x + 5$ *when* $2k - 1 < 2$.

Hence, $k < \dfrac{3}{2}$.

6 (a) $\log_4 xy = 1 + \log_2 x$

$\dfrac{\log_2 xy}{\log_2 4} = 1 + \log_2 x$

$\dfrac{\log_2 xy}{2} = 1 + \log_2 x$

$\log_2 xy = 2 + 2\log_2 x$

$\log_2 xy = 2\log_2 2 + 2\log_2 x$

$\log_2 xy = \log_2 4 + \log_2 x^2$

$\log_2 xy = \log_2 4x^2$

$xy = 4x^2$

$y = 4x \ldots ①$

(b) $9^{x-1} = \dfrac{3^y}{27}$

$3^{2x-2} = 3^{y-3}$

$2x - 2 = y - 3$

$y = 2x + 1 \ldots ②$

Gantikan ① ke dalam ②/*Substitute* ① *into* ②,

$4x = 2x + 1$

$2x = 1$

$x = \dfrac{1}{2}$

Gantikan ke dalam ①/*Substitute into* ①,

$y = 4\left(\dfrac{1}{2}\right)$

$= 2$

7 (a) $T_1 = 4 \times 2 = 8$

$EF = \sqrt{1^2 + 1^2}$

$= \sqrt{2}$

$T_2 = 4\sqrt{2}$

$JK = \sqrt{\left(\dfrac{\sqrt{2}}{2}\right)^2 + \left(\dfrac{\sqrt{2}}{2}\right)^2}$

$= 1$

$T_3 = 4$

$\dfrac{T_2}{T_1} = \dfrac{4\sqrt{2}}{8}$

$= \dfrac{\sqrt{2}}{2}$

$\dfrac{T_3}{T_2} = \dfrac{4}{4\sqrt{2}}$

$= \dfrac{1}{\sqrt{2}} \times \dfrac{\sqrt{2}}{\sqrt{2}}$

$= \dfrac{\sqrt{2}}{2}$

$\dfrac{T_2}{T_1} = \dfrac{T_3}{T_2}$

Janjang geometri dengan $r = \dfrac{\sqrt{2}}{2}$.

Geometric progression with $r = \dfrac{\sqrt{2}}{2}$.

(b) $8\left(\dfrac{\sqrt{2}}{2}\right)^{n-1} = 1$

$\left(2^{-\frac{1}{2}}\right)^{n-1} = \dfrac{1}{8}$

$2^{-\frac{1}{2}n + \frac{1}{2}} = 2^{-3}$

$-\dfrac{1}{2}n + \dfrac{1}{2} = -3$

$\dfrac{1}{2}n = \dfrac{7}{2}$

$n = 7$

(c) $S_n = \dfrac{8}{1 - \dfrac{\sqrt{2}}{2}}$

$= \dfrac{16}{2 - \sqrt{2}}$

$= \dfrac{16}{2 - \sqrt{2}} \times \dfrac{2 + \sqrt{2}}{2 + \sqrt{2}}$

$= \dfrac{16(2 + \sqrt{2})}{4 - 2}$

$= 16 + 8\sqrt{2}$ cm

8 (a) $x + y + z = 12 \ldots ①$

$2x + 1.5y + 2.5z = 23.5$

$4x + 3y + 5z = 47 \ldots ②$

$x = 2y + 1 \ldots ③$

(b) Gantikan ③ ke dalam ①/*Substitute* ③ *into* ①,

$2y + 1 + y + z = 12$

$z = 11 - 3y \ldots ④$

Gantikan ③ ke dalam ②/*Substitute* ③ *into* ②,

$4(2y + 1) + 3y + 5z = 47$

$8y + 4 + 3y + 5z = 47$

$11y + 5z = 43 \ldots ⑤$

Gantikan ④ ke dalam ⑤/*Substitute* ④ *into* ⑤,

$11y + 5(11 - 3y) = 43$

$11y + 55 - 15y = 43$

$4y = 12$

$y = 3$

Gantikan ke dalam ③/*Substitute into* ③,

$x = 2(3) + 1$

$= 7$

Gantikan ke dalam ①/*Substitute into* ①,

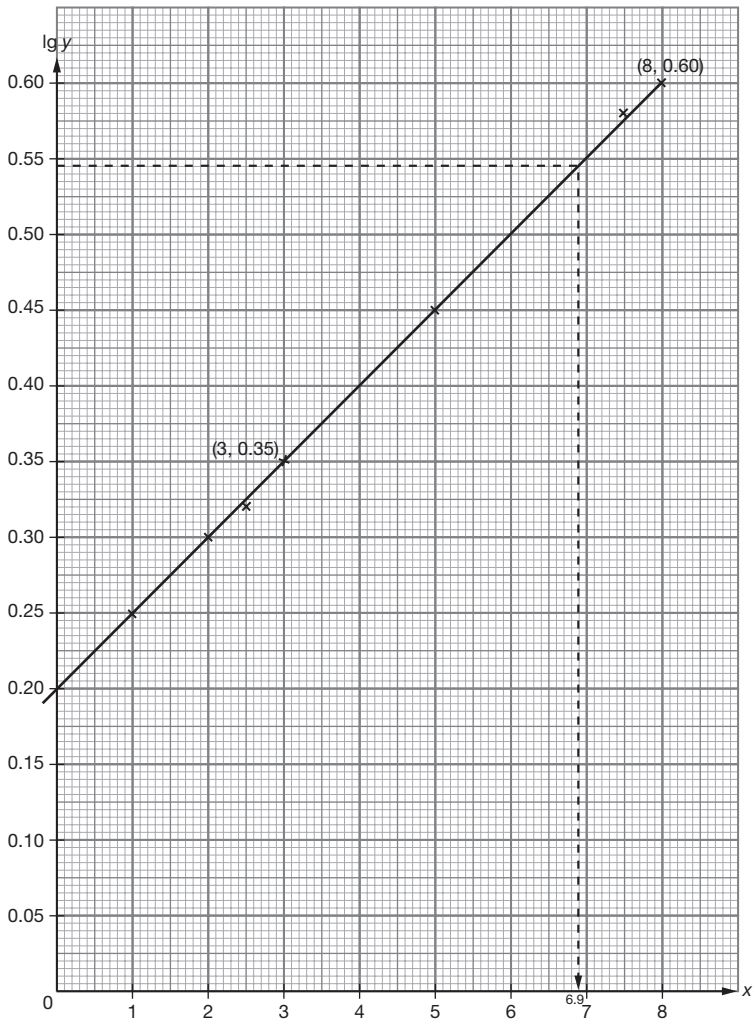
$7 + 3 + z = 12$

$z = 2$

9 (a)

x	1.0	2.0	2.5	5.0	7.5	8.0
$\log_{10} y$	0.25	0.30	0.32	0.45	0.58	0.60

(b)



(c) (i) $y = 3.5$

$\lg y = 0.544$

Daripada graf/*From the graph*, $x = 6.9$

(ii) $\lg y = \lg pq^{\frac{1}{2}x}$

$= \lg p + \lg q^{\frac{1}{2}x}$

$= \frac{1}{2}x \lg q + \lg p$

$\lg y = \left(\frac{1}{2}\lg q\right)x + \lg p$

$\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$

$Y = \quad m \quad X + c$

Daripada graf/*From the graph*,

$c = 0.20$

$\lg p = 0.20$

$p = 1.585$

(iii) Daripada graf/*From the graph*,

$m = \frac{0.60 - 0.35}{8 - 3}$

$= 0.05$

$\frac{1}{2}\lg q = 0.05$

$\lg q = 0.1$

$q = 1.259$

10 (a) $2x - 3y - 14 = 0 \ldots ①$

$3y = 2x - 14$

$y = \frac{2}{3}x - \frac{14}{3}$

$m_{PR} = \frac{2}{3}$

$\frac{2}{3}m_{QP} = -1$

$m_{QP} = -\frac{3}{2}$

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

$y = -\frac{3}{2}x - \frac{9}{2} + 2$

$= -\frac{3}{2}x - \frac{5}{2}$ … ②

(b) Gantikan ② ke dalam ①/*Substitute* ② *into* ①,

$2x - 3\left(-\frac{3}{2}x - \frac{5}{2}\right) - 14 = 0$

$2x + \frac{9}{2}x + \frac{15}{2} - 14 = 0$

$\times 2,\ 4x + 9x + 15 - 28 = 0$

$13x = 13$

$x = 1$

Gantikan ke dalam ②/*Substitute into* ②,

$y = -\frac{3}{2}(1) - \frac{5}{2}$

$= -4$

$\therefore P(1, -4)$

(c) Pada paksi-x/*At x-axis*, $y = 0$,

$2x - 14 = 0$

$2x = 14$

$x = 7$

$\therefore R(7, 0)$

Luas/*Area* $= \frac{1}{2}\begin{vmatrix} 7 & 1 & -3 & 7 \\ 0 & -4 & 2 & 0 \end{vmatrix}$

$= \frac{1}{2}|-28 + 2 + 0 - (0 + 12 + 14)|$

$= 26$ unit^2/*units*^{2}

(d) $PT = 5$

$\sqrt{(x-1)^2 + (y+4)^2} = 5$

$x^2 - 2x + 1 + y^2 + 8y + 16 = 25$

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

11 (a) (i) $\overrightarrow{SQ} = \overrightarrow{PQ} - \overrightarrow{PS}$

$= \underset{\sim}{a} - 3\overrightarrow{PM}$

$= \underset{\sim}{a} - 3\underset{\sim}{b}$

(ii) $\overrightarrow{PN} = \overrightarrow{PQ} + \overrightarrow{QN}$

$= \underset{\sim}{a} - \frac{1}{3}\overrightarrow{SQ}$

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

$= \frac{2}{3}\underset{\sim}{a} + \underset{\sim}{b}$

(b) $\overrightarrow{PR} = \overrightarrow{PS} + \overrightarrow{SR}$

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

$= k\underset{\sim}{a} + 2\underset{\sim}{b}$

$\overrightarrow{PN} = h\overrightarrow{PR}$

$\frac{2}{3}\underset{\sim}{a} + \underset{\sim}{b} = h[k\underset{\sim}{a} + 2\underset{\sim}{b}]$

$= hk\underset{\sim}{a} + 2h\underset{\sim}{b}$

Bandingkan/*Compare* $\underset{\sim}{b}$: $2h = 1$

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

Bandingkan/*Compare* $\underset{\sim}{a}$: $hk = \frac{2}{3}$

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

$k = \frac{4}{3}$

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

$\overrightarrow{SR} = \frac{4}{3}(6\underset{\sim}{i} - 3\underset{\sim}{j}) - (-4\underset{\sim}{i} + \underset{\sim}{j})$

$= 8\underset{\sim}{i} - 4\underset{\sim}{j} + 4\underset{\sim}{i} - \underset{\sim}{j}$

$= 12\underset{\sim}{i} - 5\underset{\sim}{j}$

$|\overrightarrow{SR}| = \sqrt{12^2 + (-5)^2}$

$= 13$ unit/*units*

12 (a) $BD^2 = 8^2 + 6^2 - 2(8)(6)$ kos/*cos* $105°$

$BD = 11.17$ cm

(b) $\frac{\sin \angle ADB}{7} = \frac{\sin 75°}{11.17}$

$\angle ADB = 37.25°$

(c) $\angle ABD = 180° - 75° - 37.25°$

$= 67.75°$

Luas/*Area*

$= \frac{1}{2}(6)(8)\sin 105° + \frac{1}{2}(7)(11.17)\sin 67.75°$

$= 23.182 + 36.184$

$= 59.37$ cm^2

(d) Luas/*Area* $BDC = 23.182$

$\frac{1}{2} \times 11.17 \times h = 23.182$

$h = 4.151$ cm

13 (a) $s = \frac{10 + 11 + 17}{2}$

$= 19$

$A = \sqrt{19(19 - 10)(19 - 11)(19 - 17)}$

$= 52.31$ cm^2

(b) $\frac{1}{2}(17)(10)\sin \angle ABD = 52.31$

$\angle ABD = 37.98°$

(c) $\frac{\sin \angle ADB}{17} = \frac{\sin 37.98°}{11}$

$\angle ADB = 72.00°$

(d) Biar M = titik tengah bagi BC

Let M = midpoint of BC

$DM = \sqrt{10^2 - 8^2} = 6$ cm

$AM = \sqrt{17^2 - 8^2} = 15$ cm

kos/*cos* $\angle DMA = \frac{6^2 + 15^2 - 11^2}{2(6)(15)}$

$\angle DMA = 38.94°$

14 (a) $\frac{P_{16}}{\text{RM}280} \times 100 = 115$

$P_{16} = \text{RM}322$

(b) $2m + 25 + m + 15 = 100$

$3m = 60$

$m = 20$

$\therefore$ Nisbah/*Ratio* $= 40 : 25 : 20 : 15$

$= 8 : 5 : 4 : 3$

$\bar{I} = 117.5$

$\frac{115(8) + 5n + 105(4) + 130(3)}{8 + 5 + 4 + 3} = 117.50$

$\frac{5n + 1\,730}{20} = 117.5$

$n = 124$

(c) $\frac{\text{RM}9.40}{P_{13}} \times 100 = 117.5$

$P_{13} = \text{RM}8$

(d) $I_{16,\,19} = 128$

$I_{13,\,19} = \frac{I_{13,\,16} \times I_{16,\,19}}{100}$

$= \frac{117.5 \times 128}{100}$

$= 150.4$

15 (a) $\frac{P_{18}}{\text{RM}45} \times 100 = 136$

$P_{18} = \text{RM}61.20$

(b) Pemberat/*Weightages* = 2 : 14 : 3 : 1

$I_{15,18} = 124$

$\frac{105(2) + x(14) + 128(3) + 136(1)}{20} = 124$

$14x + 730 = 2\,480$

$14x = 1\,750$

$x = 125$

(c) *A*: $I_{15,\,21} = \frac{105 \times 100}{100} = 105$

B: $I_{15,\,21} = \frac{125 \times 105}{100} = 131.25$

C: $I_{15,\,21} = \frac{128 \times 120}{100} = 153.6$

D: $I_{15,\,21} = \frac{136 \times 90}{100} = 122.4$

$\bar{I}_{15,\,21} = \frac{105(2) + 131.25(14) + 153.6(3) + 122.4(1)}{20}$

$= 131.54$

(d) $\frac{\text{RM}18}{P_{15}} \times 100 = 131.54$

$P_{15} = \text{RM}13.68$