

Penyelesaian Lengkap

Pentaksiran Sumatif

Kertas 1

- 1 Bagi 1 subjek, yurannya ialah RM75.

For 1 subject, the fee is RM75.

Bagi 2 subjek, yurannya ialah RM75 – (5 × 1) setiap subjek, maka jumlah yuran ialah RM(75 – 5 × 1) × 2.

For 2 subjects, the fee is RM75 – (5 × 1) per subject, hence the total fee is RM(75 – 5 × 1) × 2.

Bagi 3 subjek, yurannya ialah RM75 – (5 × 2) setiap subjek, maka jumlah yuran ialah RM(75 – 5 × 2) × 3.

For 3 subjects, the fee is RM75 – (5 × 2) per subject, hence the total fee is RM(75 – 5 × 2) × 3.

Bagi 4 subjek, yurannya ialah RM75 – (5 × 3) setiap subjek, maka jumlah yuran ialah RM(75 – 5 × 3) × 4.

For 4 subjects, the fee is RM75 – (5 × 3) per subject, hence the total fee is RM(75 – 5 × 3) × 4.

Bagi x subjek, yurannya ialah RM75 – (5 × ($x - 1$)) setiap subjek, maka jumlah yuran ialah RM(75 – 5 × ($x - 1$)) × x .

For x subjects, the fee is RM75 – (5 × ($x - 1$)) per subject, hence the total fee is RM(75 – 5 × ($x - 1$)) × x .

$$\begin{aligned} \text{(a) } f(x) &= [75 - 5(x - 1)]x \\ &= [75 - 5x + 5] \\ &= [80 - 5x]x \\ &= 80x - 5x^2 \end{aligned}$$

$$\begin{aligned} \text{(b) } g(0) &= 3(0) - 5 \\ &= -5 \\ g(4) &= 3(4) - 5 \\ &= 7 \end{aligned}$$

Julat bagi/Range for $g(x)$: $-5 \leq g(x) \leq 7$

Domain bagi/Domain for $g^{-1}(x)$: $-5 \leq x \leq 7$

- 2 (a) $y = -2(x + k)^2 + m \dots$ ①

$$y_{\max} = m, x = -k$$

Paksi simetri/Axis of symmetry:

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

$$x = h$$

$$-k = h$$

$$k = -h \dots$$
 ②

Gantikan ② ke dalam ①/Substitute ② into ①,

$$y = -2(x - h)^2 + m$$

Gantikan ke dalam/Substitute into (3h, 0),

$$0 = -2(3h - h)^2 + m$$

$$0 = -8h^2 + m$$

$$m = 8h^2$$

$$\text{(b) } (p + 1)x^2 - 2px + p + 3 = 0$$

$$b^2 - 4ac > 0$$

$$\begin{aligned} (-2p)^2 - 4(p + 1)(p + 3) &> 0 \\ 4p^2 - 4(p^2 + 4p + 3) &> 0 \\ 4p^2 - 4p^2 - 16p - 12 &> 0 \\ -16p &> 12 \\ p &< -\frac{3}{4} \end{aligned}$$

$$\text{3 (a) } 3x - 4y + k = 0$$

$$4y = 3x + k$$

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

Pintasan-y/y-intercept, $c = \frac{k}{4}$

$$\therefore Q\left(0, \frac{k}{4}\right)$$

$$\text{(b) } m_{PQ} = \frac{3}{4}$$

$$\frac{3}{4}m_{QR} = -1$$

$$m_{QR} = -\frac{4}{3}$$

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

$$x = -\frac{k}{4} \times \left(-\frac{3}{4}\right)$$

Pintasan-x/x-intercept = $\frac{3k}{16}$

$$\therefore R\left(\frac{3k}{16}, 0\right)$$

$$\text{4 (a) } \vec{OC} = \vec{OA} + \vec{AC}$$

$$= \vec{OA} + \frac{2}{3}\vec{AB}$$

$$= \vec{a} + \frac{2}{3}(-\vec{a} + \vec{b})$$

$$= \frac{1}{3}\vec{a} + \frac{2}{3}\vec{b}$$

$$\text{(b) } \vec{BD} = \vec{BO} + \vec{OD}$$

$$= \vec{BO} + \frac{4}{3}\vec{OC}$$

$$= -\vec{b} + \frac{4}{3}\left(\frac{1}{3}\vec{a} + \frac{2}{3}\vec{b}\right)$$

$$= -\vec{b} + \frac{4}{9}\vec{a} + \frac{8}{9}\vec{b}$$

$$= \frac{4}{9}\vec{a} - \frac{1}{9}\vec{b}$$

$$\text{5 (a) } kx^2 + (1 - k^2)x - k = 0$$

$$kx^2 + x - k^2x - k = 0$$

$$x(kx + 1) - k(kx + 1) = 0$$

$$(kx + 1)(x - k) = 0$$

$$x = -\frac{1}{k}, x = k$$

$$\begin{aligned}
 \text{(b) } f(x) &= -x^2 + 2px + 3 \\
 &= -(x - 2px) + 3 \\
 &= -[(x - p)^2 - p^2] + 3 \\
 &= -(x - p)^2 + p^2 + 3 \\
 p^2 + 3 &= 12 \\
 p^2 &= 9 \\
 p &= \pm 3
 \end{aligned}$$

$$\begin{aligned}
 \text{6 (a) } S_{4AP} &= S_{2GP} \\
 \frac{4}{2}(2x + 3y) &= x + xy \\
 2x + 3y &= x + xy \\
 3y &= xy - x \\
 x(y - 1) &= 3y \\
 x &= \frac{3y}{y - 1} \dots \textcircled{1}
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } T_{10AP} &= T_{3GP} \\
 x + 9y &= xy^2 \dots \textcircled{2}
 \end{aligned}$$

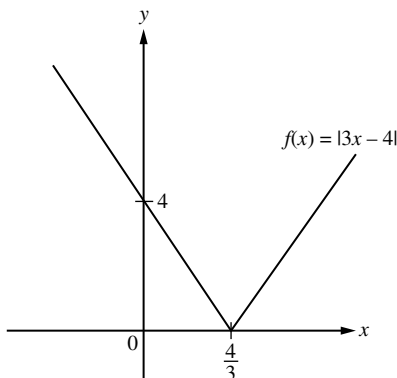
Gantikan $\textcircled{2}$ ke dalam $\textcircled{1}$ /Substitute $\textcircled{2}$ into $\textcircled{1}$,

$$\begin{aligned}
 \frac{3y}{y - 1} + 9y &= \left(\frac{3y}{y - 1}\right)y^2 \\
 3y + 9y(y - 1) &= 3y^3 \\
 3y + 9y^2 - 9y &= 3y^3 \\
 9y^2 - 6y &= 3y^3 \\
 3y^3 - 9y^2 + 6y &= 0 \\
 3y(y^2 - 3y + 2) &= 0 \\
 3y(y - 1)(y - 2) &= 0 \\
 y \neq 0, y \neq 1, y &= 2
 \end{aligned}$$

Gantikan ke dalam $\textcircled{1}$ /Substitute into $\textcircled{1}$,

$$\begin{aligned}
 x &= \frac{3(2)}{2 - 1} \\
 x &= 6
 \end{aligned}$$

$$\begin{aligned}
 \text{7 (a) } f(x) &= |3x - 4| \\
 f(0) &= |3(0) - 4| \\
 &= 4 \\
 |3x - 4| &= 0 \\
 x &= \frac{4}{3}
 \end{aligned}$$



$$\begin{aligned}
 \text{(b) } |3x - 4| &= 5 \\
 3x - 4 &= -5, & 3x - 4 &= 5 \\
 x &= -\frac{1}{3}, & x &= 3
 \end{aligned}$$

Daripada graph/From the graph,

$$-\frac{1}{3} \leq x \leq 3$$

$$\begin{aligned}
 \text{8 (a) } 4^{2x - \frac{1}{2}y + 1} &= \frac{4^{2x}}{4^{\frac{1}{2}y}} \times 4 \\
 &= \frac{2^{4x}}{2^y} \times 4 \\
 &= \frac{3^4}{5} \times 4 \\
 &= 64.8
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } \log_x 18 - 2 \log_x 3 &= 1 + \log_x 5 \\
 \log_x 18 - \log_x 9 &= \log_x x + \log_x 5 \\
 \log_x \frac{18}{9} &= \log_x 5x \\
 \log_x 2 &= \log_x 5x \\
 2 &= 5x \\
 x &= \frac{2}{5}
 \end{aligned}$$

$$\begin{aligned}
 \text{9 (a) } y &= 2^{3x - 1} \\
 \log_{10} y &= \log_{10} 2^{3x - 1} \\
 \log_{10} y &= (3x - 1)\log_{10} 2 \\
 \log_{10} y &= (3 \log_{10} 2)x - \log_{10} 2 \\
 m &= 3 \log_{10} 2 \\
 c &= -\log_{10} 2
 \end{aligned}$$

$$\begin{aligned}
 \text{(b) } m &= \frac{3p - p}{-2 - 4} \\
 &= \frac{2p}{-6} \\
 &= -\frac{p}{3}
 \end{aligned}$$

$$Y - p = -\frac{p}{3}(X - 4)$$

$$Y = -\frac{p}{3}X + \frac{4p}{3} + p$$

$$Y = -\frac{p}{3}X + \frac{7}{3}p$$

$$y^2 = -\frac{p}{3}\left(\frac{1}{x}\right) + \frac{7}{3}p$$

$$y = \sqrt{-\frac{p}{3}\left(\frac{1}{x}\right) + \frac{7}{3}p}$$

$$y = \sqrt{a\left(\frac{1}{x}\right) + b}$$

$$\text{(i) } a = -\frac{p}{3}$$

$$\text{(ii) } b = \frac{7}{3}p$$

$$\begin{aligned}
 \text{10 (a) } 3h - k &= 0 \\
 k &= 3h \dots \textcircled{1}
 \end{aligned}$$

$$2k + 5m = 0 \dots \textcircled{2}$$

Gantikan $\textcircled{1}$ ke dalam $\textcircled{2}$ /Substitute $\textcircled{1}$ into $\textcircled{2}$,

$$2(3h) + 5m = 0$$

$$h = -\frac{5}{6}m$$

$$\begin{aligned}
 \text{(b) } \vec{RS} &= 5\vec{i} - 9\vec{j} - \vec{i} - 7\vec{j} \\
 &= 4\vec{i} - 16\vec{j}
 \end{aligned}$$

$$\vec{RT} = \frac{1}{4}(4\vec{i} - 16\vec{j})$$

$$= \vec{i} - 4\vec{j}$$

$$\begin{aligned}
 \vec{OT} &= \vec{i} + 7\vec{j} + \vec{i} - 4\vec{j} \\
 &= 2\vec{i} + 3\vec{j}
 \end{aligned}$$

$$\hat{k} = \frac{2i + 3j}{\sqrt{2^2 + 3^2}}$$

$$= \frac{2i + 3j}{\sqrt{13}}$$

11 (a) (i) $S_6 = 21k + 12$

$$\frac{6}{2}[2a + 5d] = 21k + 12$$

$$2a + 5d = 7k + 4 \dots \textcircled{1}$$

$$T_9 = 9k + 13$$

$$a + 8d = 9k + 13 \dots \textcircled{2}$$

$$\textcircled{2} \times 2, 2a + 16d = 18k + 26 \dots \textcircled{3}$$

$$\textcircled{3} - \textcircled{1}, 11d = 11k + 22$$

$$d = k + 2$$

(ii) Gantikan ke dalam $\textcircled{2}$ /Substitute into $\textcircled{2}$,

$$a + 8(k + 2) = 9k + 13$$

$$a + 8k + 16 = 9k + 13$$

$$a = k - 3$$

(b) (i) $r = 2x$

$$-1 < 2x < 1$$

$$-\frac{1}{2} < x < \frac{1}{2}$$

(ii) $\frac{x}{1 - 2x} = S$

$$x = S - 2Sx$$

$$2Sx + x = S$$

$$x(2S + 1) = S$$

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

12 (a) Punca-punca/Roots = $3\alpha, 2\alpha$

$$\text{HTP/SOR: } 3\alpha + 2\alpha = \frac{-[-(2p + 1)]}{3}$$

$$15\alpha = 2p + 1 \dots \textcircled{1}$$

$$\text{HDP/POR: } 3\alpha \times 2\alpha = \frac{18}{3}$$

$$\alpha^2 = 1$$

$$\alpha = 1$$

(i) Punca-punca/Roots = 2, 3

(ii) Gantikan ke dalam $\textcircled{1}$ /Substitute into $\textcircled{1}$,

$$15(1) = 2p + 1$$

$$2p = 14$$

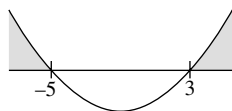
$$p = 7$$

(b) $x(x + 2) \geq 15$

$$x^2 + 2x - 15 \geq 0$$

$$(x + 5)(x - 3) \geq 0$$

$$\therefore x > 0, \therefore x \geq 3$$



13 (a) $2x + 3y - z = q$

Gantikan/Substitute ($p, -1, 3$),

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

$$q = 2p - 6 \dots \textcircled{1}$$

$$x - 2qy + 2z = 14$$

Gantikan/Substitute ($p, -1, 3$),

$$p - 2q(-1) + 2(3) = 14$$

$$p + 2q + 6 = 14$$

$$p + 2q = 8 \dots \textcircled{2}$$

Gantikan $\textcircled{1}$ ke dalam $\textcircled{2}$ /Substitute $\textcircled{1}$ into $\textcircled{2}$,

$$p + 2(2p - 6) = 8$$

$$p + 4p - 12 = 8$$

$$5p = 20$$

$$p = 4$$

Gantikan ke dalam $\textcircled{1}$ /Substitute into $\textcircled{1}$,

$$q = 2(4) - 6$$

$$= 2$$

$$3x + y + rz = -4$$

Gantikan/Substitute ($4, -1, 3$),

$$3(4) + (-1) + r(3) = -4$$

$$11 + 3r = -4$$

$$3r = -15$$

$$r = -5$$

(b) $y = 2x - 5 \dots \textcircled{1}$

$$x^2 + y^2 - 3xy = 16 \dots \textcircled{2}$$

Gantikan $\textcircled{1}$ ke dalam $\textcircled{2}$,

Substitute $\textcircled{1}$ into $\textcircled{2}$,

$$x^2 + (2x - 5)^2 - 3x(2x - 5) = 16$$

$$x^2 + 4x^2 - 20x + 25 - 6x^2 + 15x = 16$$

$$-x^2 - 5x + 25 = 16$$

$$x^2 + 5x - 9 = 0$$

$$x = \frac{-5 \pm \sqrt{(5)^2 - 4(1)(-9)}}{2(1)}$$

$$= \frac{-5 \pm \sqrt{61}}{2}$$

$$x = -6.405, 1.405$$

Gantikan ke dalam $\textcircled{1}$ /Substitute into $\textcircled{1}$,

$$y = 2(-6.405) - 5$$

$$= -17.810$$

$$y = 2(1.405) - 5$$

$$= -2.190$$

14 (a) $\frac{2^{3x+1} + 6(8^x)}{2^{-x}(2^{4x+5})}$

$$= \frac{2^{3x} \times 2 + 6(8^x)}{2^{-x+4x+5}}$$

$$= \frac{2 \times (8^x) + 6(8^x)}{2^{3x} \times 2^5}$$

$$= \frac{8(8^x)}{32(8^x)}$$

$$= \frac{1}{4}$$

(b) $\log_6 a = \frac{1}{\log_a 6}$

$$= \frac{1}{\log_a 2 + \log_a 3}$$

$$= \frac{1}{\frac{1}{\log_2 a} + \frac{1}{\log_3 a}}$$

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

$$= \frac{xy}{x + y}$$

15 (a) $p = \frac{3(-h) + 2(3h)}{2 + 3}$

$$p = \frac{3h}{5} \dots \textcircled{1}$$

$$0 = \frac{3(k-2) + 2(4p)}{2+3}$$

$$3k - 6 + 8p = 0 \dots \textcircled{2}$$

Gantikan ① ke dalam ②,
Substitute ① into ②,

$$3k - 6 + 8\left(\frac{3}{5}h\right) = 0$$

$$k - 2 + \frac{8}{5}h = 0$$

$$k = 2 - \frac{8}{5}h$$

(b) (i) Biar lokus/Let locus = $Q(x, y)$
 $PQ = SQ$

$$\sqrt{(x+3)^2 + (y-2)^2} = \sqrt{(x-1)^2 + (y-5)^2}$$

$$x^2 + 6x + 9 + y^2 - 4y + 4 = x^2 - 2x + 1 + y^2 - 10y + 25$$

$$6x - 4y + 13 = -2x - 10y + 26$$

$$8x + 6y = 13$$

(ii) Pada paksi- x /At x -axis, $y = 0$,
 $8x = 13$
 $x = \frac{13}{8}$
 $= 1.625 \text{ km}$

Kertas 2

1 $\frac{1}{2}(6)(8) - xy = 15$
 $xy = 9$
 $y = \frac{9}{x} \dots \textcircled{1}$

Dengan menggunakan segi tiga yang serupa,
By using similar triangles,

$$\frac{x}{6} = \frac{8-y}{8}$$

$$4x = 24 - 3y \dots \textcircled{2}$$

Gantikan ① ke dalam ②,
Substitute ① into ②,

$$4x = 24 - 3\left(\frac{9}{x}\right)$$

$$4x^2 - 24x + 27 = 0$$

$$(2x-9)(2x-3) = 0$$

$$x = \frac{9}{2}, x = \frac{3}{2}$$

Gantikan ke dalam ①/Substitute into ①,

$$y = \frac{9}{\frac{9}{2}}, y = \frac{9}{\frac{3}{2}}$$

$$y = 2, y = 6$$

2 (a) $A = \frac{1}{2}(2\sqrt{3}-1)(\sqrt{3}+2)$
 $= \frac{1}{2}(2(3) + 4\sqrt{3} - \sqrt{3} - 2)$
 $= \frac{4 + 3\sqrt{3}}{2} \text{ cm}^2$

(b) $QS^2 = (2\sqrt{3}-1)^2 + (\sqrt{3}+2)^2$
 $= 4(3) - 4\sqrt{3} + 1 + 3 + 4\sqrt{3} + 4$
 $= 20$
 $= 4 \times 5$
 $QS = 2\sqrt{5} \text{ cm}$

(c) $\cos/\cos \angle RQS = \frac{2\sqrt{5}}{\sqrt{5}+2}$
 $= \frac{2\sqrt{5}}{\sqrt{5}+2} \times \frac{\sqrt{5}-2}{\sqrt{5}-2}$
 $= \frac{2(5) - 4\sqrt{5}}{5-4}$
 $= 10 - 4\sqrt{5}$

3 (a) (i) $\underline{v}_p = \frac{35\underline{i} - 20\underline{j}}{5}$
 $= 7\underline{i} - 4\underline{j}$
 $\overrightarrow{OP} = t(7\underline{i} - 4\underline{j})$
 $= 7t\underline{i} - 4t\underline{j}$

(ii) $\overrightarrow{OQ} = -12\underline{i} + 60\underline{j} + t(8\underline{i} - 9\underline{j})$
 $= (-12 + 8t)\underline{i} + (60 - 9t)\underline{j}$

(b) $\overrightarrow{OP} = \overrightarrow{OQ}$
 $7t\underline{i} - 4t\underline{j} = (-12 + 8t)\underline{i} + (60 - 9t)\underline{j}$
 $\underline{i}: 7t = -12 + 8t$
 $t = 12$
 $\underline{j}: -4t = 60 - 9t$
 $5t = 60$
 $t = 12$

Kedua-dua zarah itu bertemu pada $t = 12$

Both particles meet at $t = 12$

$$\overrightarrow{OP} = 7(12)\underline{i} - 4(12)\underline{j}$$

$$= 84\underline{i} - 48\underline{j}$$

4 $2x^2 + 4kx + k + 3 = 0$

(a) (i) HTP/SOR: $\alpha + \beta = -\frac{4k}{2}$
 $= -2k$

(ii) HDP/POR: $\alpha\beta = \frac{k+3}{2}$

(b) $3x^2 - 6x + 2p - 5 = 0$

(i) HTP/SOR: $\alpha^2 + \beta^2 = -\frac{(-6)}{3}$

$$(\alpha + \beta)^2 - 2\alpha\beta = 2$$

$$(-2k)^2 - 2\left(\frac{k+3}{2}\right) = 2$$

$$4k^2 - k - 3 = 2$$

$$4k^2 - k - 5 = 0$$

$$(4k-5)(k+1) = 0$$

$$k \neq \frac{5}{4}, k = -1$$

(ii) HDP/POR: $\alpha^2 \times \beta^2 = \frac{2p-5}{3}$

$$(\alpha\beta)^2 = \frac{2p-5}{3}$$

$$\left(\frac{-1+3}{2}\right)^2 = \frac{2p-5}{3}$$

$$1 = \frac{2p-5}{3}$$

$$3 = 2p - 5$$

$$p = 4$$

5 (a) $f^2(2) = ff(2)$
 $= f(4(2) - 1)$
 $= f(7)$
 $= 4(7) - 1$
 $= 27$

(b) Biar/Let $f^{-1}(x) = y$
 $f(y) = x$

$$4y - 1 = x$$

$$y = \frac{x+1}{4}$$

$$f^{-1}(x) = \frac{x+1}{4}$$

$$f^{-1}g(x) = f^{-1}\left(\frac{1}{3}x^2 + 2\right)$$

$$= \frac{\frac{1}{3}x^2 + 2 + 1}{4}$$

$$= \frac{\frac{1}{3}x^2 + 3}{4}$$

$$= \frac{x^2 + 9}{12}$$

(c) Biar/Let $g(x) = y$

$$y = \frac{1}{3}x^2 + 2$$

$$\frac{1}{3}x^2 = y - 2$$

$$x^2 = 3y - 6$$

$$h(y) = 2x^2 + 7$$

$$h(y) = 2(3y - 6) + 7$$

$$= 6y - 12 + 7$$

$$= 6y - 5$$

$$\therefore h(x) = 6x - 5$$

6 (a) $x + y + z = 25 \dots \textcircled{1}$

$$2x + 3y + 5z = 71 \dots \textcircled{2}$$

$$1.5x + 1y + 0.5z = 29$$

$$3x + 2y + z = 58 \dots \textcircled{3}$$

(b) $\textcircled{3} - \textcircled{1}, 2x + y = 33 \dots \textcircled{4}$

$$\textcircled{1} \times 5, 5x + 5y + 5z = 125 \dots \textcircled{5}$$

$$\textcircled{5} - \textcircled{2}, 3x + 2y = 54 \dots \textcircled{6}$$

$$\textcircled{4} \times 2, 4x + 2y = 66 \dots \textcircled{7}$$

$$\textcircled{7} - \textcircled{6}, x = 12$$

Gantikan ke dalam $\textcircled{4}$ /Substitute into $\textcircled{4}$,

$$2(12) + y = 33$$

$$y = 9$$

Gantikan ke dalam $\textcircled{1}$ /Substitute into $\textcircled{1}$,

$$12 + 9 + z = 25$$

$$z = 4$$

7 (a) $T = 4\pi(27)^2 = 2\,916\pi$

$$T_2 = 4\pi(18)^2 = 1\,296\pi$$

$$r = \frac{1\,296\pi}{2\,916\pi}$$

$$= \frac{4}{9}$$

(b) $4\pi(27)^2 \left(\frac{4}{9}\right)^{n-1} < 50\pi$

$$\left(\frac{4}{9}\right)^{n-1} < \frac{25}{1\,458}$$

$$\lg\left(\frac{4}{9}\right)^{n-1} < \lg\frac{25}{1\,458}$$

$$(n-1)\lg\left(\frac{4}{9}\right) < \lg\frac{25}{1\,458}$$

$$n > 6.01$$

$$n = 7$$

(c) $S_\infty = \frac{4\pi(27)^2}{1 - \frac{4}{9}}$

$$= 5\,248\frac{4}{5}\pi \text{ cm}^2$$

8 (a) $f(x) = 4 + 4x - 2x^2$

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

$$= -2[(x-1)^2 - 1] + 4$$

$$= -2(x-1)^2 + 2 + 4$$

$$= -2(x-1)^2 + 6$$

$$f(x)_{\max} = 6, x = 1$$

Titik maksimum/Maximum point = (1, 6)

(b) $-2(x-1)^2 + 6 = 0$

$$2(x-1)^2 = 6$$

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

$$x-1 = \pm\sqrt{3}$$

$$x = 1 \pm \sqrt{3}$$

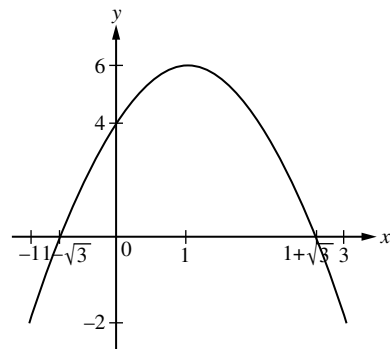
(c) Pada paksi x /At y -axis, $x = 0, y = 4$

$$x = -1, y = -2(-1-1)^2 + 6$$

$$= -2$$

$$x = 3, y = -2(3-1)^2 + 6$$

$$= -2$$



(d) $2x^2 - 4x + 3 = 0$

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

$$7 = 4 + 4x - 2x^2$$

Garis $y = 7$ tidak menyalang $y = 4 + 4x - 2x^2$.

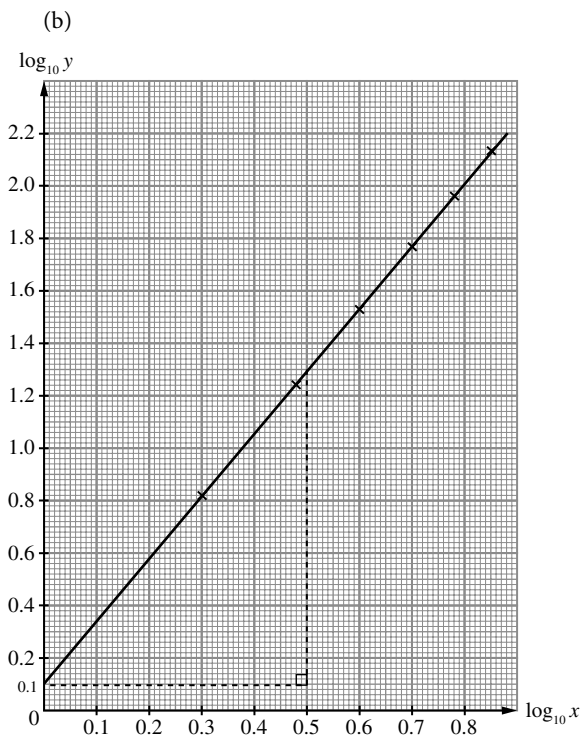
Line $y = 7$ does not intercept $y = 4 + 4x - 2x^2$.

Persamaan tidak mempunyai punca yang nyata.

The equation has no real root.

9 (a)

$\log_{10} x$	0.30	0.48	0.60	0.70	0.78	0.85
$\log_{10} y$	0.82	1.25	1.54	1.78	1.97	2.14



(c) $\log_{10} py = \log_{10} x^n$
 $\log_{10} p + \log_{10} y = n \log_{10} x$
 $\log_{10} y = n \log_{10} x - \log_{10} p$
 (i) Dari graph/From the graph,

$$m = \frac{1.3 - 0.1}{0.5 - 0}$$

$$m = 2.4$$

$$c = 0.1$$

$$n = 2.4 \pm 0.1$$

(ii) $-\log_{10} p = 0.1 \pm 0.02$

$$p = 0.7943 \pm 0.04$$

10 (a) $m_{BC} = -\frac{3}{(-2)}$
 $= \frac{3}{2}$

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

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

$$y - 0 = -\frac{2}{3}(x + 2)$$

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

$$AD: x = 4$$

$$y = -\frac{2}{3}(4) - \frac{4}{3}$$

$$y = -4$$

$$\therefore A(4, -4)$$

(b) Biar/Let $D(4, k)$,

$$\frac{1}{2} \begin{vmatrix} 4 & -2 & 0 & 4 & 4 \\ -4 & 0 & 3 & k & -4 \end{vmatrix} = 25$$

$$\frac{1}{2} |-6 - 16 - (8 + 12 + 4k)| = 25$$

$$\frac{1}{2} |-42 - 4k| = 25$$

$$|-21 - 2k| = 25$$

$$-21 - 2k = -25 \text{ (Arah jam/Clockwise)}$$

$$k = 2$$

$$\therefore D(4, 2)$$

(c) $PC = PD$
 $\sqrt{(x-0)^2 + (y-3)^2} = \sqrt{(x-4)^2 + (y-2)^2}$
 $x^2 + y^2 - 6y + 9 = x^2 - 8x + 16 + y^2 - 4y + 4$
 $8x - 2y - 11 = 0$

11 (a) (i) $\vec{BC} = \frac{3}{4}\vec{OA}$

$$= \frac{3}{4}(4\mathbf{a})$$

$$= 3\mathbf{a}$$

$$\vec{OC} = \vec{OB} + \vec{BC}$$

$$= \mathbf{b} + 3\mathbf{a}$$

(ii) $\vec{BA} = \vec{OA} - \vec{OB}$

$$= 4\mathbf{a} - \mathbf{b}$$

(b) $\vec{OD} = \vec{OB} + \vec{BD}$

$$n\vec{OC} = \mathbf{b} + m\vec{BA}$$

$$n(\mathbf{b} + 3\mathbf{a}) = \mathbf{b} + m(4\mathbf{a} - \mathbf{b})$$

$$n\mathbf{b} + 3n\mathbf{a} = \mathbf{b} + 4m\mathbf{a} - m\mathbf{b}$$

$$3n\mathbf{a} + n\mathbf{b} = 4m\mathbf{a} + (1 - m)\mathbf{b}$$

Bandingkan/Compare \mathbf{a} : $3n = 4m \dots \textcircled{1}$

Bandingkan/Compare \mathbf{b} : $n = 1 - m \dots \textcircled{2}$

Gantikan $\textcircled{2}$ ke dalam $\textcircled{1}$,

Substitute $\textcircled{2}$ into $\textcircled{1}$,

$$3(1 - m) = 4m$$

$$3 - 3m = 4m$$

$$7m = 3$$

$$m = \frac{3}{7}$$

Gantikan ke dalam $\textcircled{2}$ /Substitute into $\textcircled{2}$,

$$n = 1 - \frac{3}{7}$$

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

(c) Nisbah/Ratio of $OD : OC = 4 : 7$

Biar jarak serenjang dari C dan D ke garis OA masing-masing ialah h_1 dan h_2 .

Let the perpendicular distance from D and C to line OA is h_1 and h_2 respectively.

Dengan menggunakan segi tiga yang serupa,

Using similar triangles,

$$\frac{h_1}{h_2} = \frac{4}{7}$$

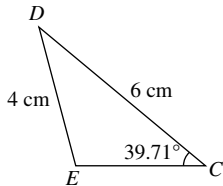
$$\frac{\text{Luas/Area of } \triangle ODA}{\text{Luas/Area of } \triangle OCA} = \frac{\frac{1}{2} \times |4\mathbf{a}| \times h_1}{\frac{1}{2} \times |4\mathbf{a}| \times h_2}$$

$$\frac{\text{Luas/Area of } \triangle ODA}{21} = \frac{4}{7}$$

$$\text{Luas/Area of } \triangle ODA = \frac{4}{7} \times 21$$

$$= 12 \text{ unit}^2/\text{units}^2$$

- 12 (a) (i) $\frac{1}{2}(8)(9)\sin \angle ACB = 23$
 $\angle ACB = 39.71^\circ$
(ii) $AB^2 = 8^2 + 9^2 - 2(8)(9)\cos 39.71^\circ$
 $AB = 5.850 \text{ cm}$
(b) (i) $EC = \frac{3}{4} \times 8$
 $= 6 \text{ cm}$



- (ii) $\frac{\sin \angle DEC}{6} = \frac{\sin 39.71^\circ}{4}$
 $\angle DEC = 180^\circ - 73.41^\circ$
 $= 106.59^\circ$
(iii) $\angle EDC = 180^\circ - 39.71^\circ - 106.59^\circ$
 $= 33.70^\circ$
 $A = 23 - \frac{1}{2}(4)(6) \sin 33.70^\circ$
 $= 16.34 \text{ cm}^2$
- 13 (a) $PR^2 = 6^2 + 7^2 - 2(6)(7) \cos 100^\circ$
 $PR = 9.979 \text{ cm}$
(b) $\frac{\sin \angle QPR}{7} = \frac{\sin 100^\circ}{9.979}$
 $\angle QPR = 43.69^\circ$
(c) $PS = \sqrt{6^2 + 4^2}$
 $= \sqrt{52}$
 $SR = \sqrt{7^2 + 4^2}$
 $= \sqrt{65}$
 $s = \frac{\sqrt{52} + \sqrt{65} + 9.979}{2}$
 $= 12.626$
 $A = \sqrt{12.626(12.626 - \sqrt{52})(12.626 - \sqrt{65})(12.626 - 9.979)}$
 $= 28.739 \text{ cm}^2$
(d) $\frac{1}{2}(\sqrt{52})(\sqrt{65}) \sin \angle PSR = 28.739$
 $\angle PSR = 81.36^\circ$
- 14 (a) $\frac{\text{RM}16}{P_{12}} \times 100 = 124$
 $P_{12} = \text{RM}12.90$
(b) Pemberat/Weightage = 3 : 6 : 4 : 2
 $\bar{I}_{12,16} = 121.6$
 $\frac{130(3) + 124(6) + x(4) + 105(2)}{3 + 6 + 4 + 2} = 121.6$
 $\frac{4x + 1\ 344}{15} = 121.6$

$$4x + 1\ 344 = 1\ 824$$

$$4x = 480$$

$$x = 120$$

- (c) Syampu/Shampoo $\bar{I}_{12,20}$
 $P: \frac{130 \times 115}{100} = 149.5$
 $Q: \frac{124 \times 100}{100} = 124$
 $R: \frac{120 \times 95}{100} = 114$
 $S: \frac{105 \times 110}{100} = 115.5$
 $\bar{I}_{15,21} = \frac{149.5(3) + 124(6) + 114(4) + 115.5(2)}{15}$
 $= 125.3$
(d) $\frac{P_{20}}{\text{RM}36\ 500} \times 100 = 125.3$
 $P_{20} = \text{RM}45\ 734.50$
- 15 (a) $W: a = \frac{15.50}{12.40} \times 100$
 $= 125$
 $Y: \frac{14.90}{b} \times 100 = 138$
 $b = 10.80$
(b) $\sum w = 12$
 $2 + m + 3 + n = 12$
 $n = 7 - m \dots \textcircled{1}$
 $\bar{I}_{15,21} = 135$
 $\frac{125(2) + 140m + 138(3) + 116n}{12} = 135$
 $140m + 116n + 664 = 1\ 620$
 $35m + 29n = 239 \dots \textcircled{2}$
Gantikan $\textcircled{1}$ ke dalam $\textcircled{2}$,
Substitute $\textcircled{1}$ into $\textcircled{2}$,
 $35m + 29(7 - m) = 239$
 $35m + 203 - 29m = 239$
 $6m = 36$
 $m = 6$
Gantikan ke dalam $\textcircled{1}$,
Substitute into $\textcircled{1}$,
 $n = 7 - 6$
 $= 1$
(c) $\frac{\bar{I} \times 121}{100} = 140$
 $\bar{I} = 115.70$
(d) $\frac{P_{21}}{4} \times 100 = 135$
 $P_{21} = \text{RM}5.40$
Harga/Price = $\frac{125}{100} \times \text{RM}5.40$
 $= \text{RM}6.75$