

3472/2

Additional

Mathematics

Mei 2014



PROGRAM PENINGKATAN PRESTASI AKADEMIK SPM 2014

MODUL 1

ADDITIONAL MATHEMATICS

Paper 2

MARKING SCHEME

MARKING SCHEME
ADDITIONAL MATHEMATICS PAPER 2

NO.	SOLUTION	MARKS
1	$x = y + 4$ or $y = x - 4$ $(y + 4)^2 + y^2 = 10$ $x^2 + (x - 4)^2 = 10$ $2y^2 + 8y + 6 = 0$ $2x^2 - 8x + 6 = 0$ $(y + 1)(y + 3) = 0$ $(x - 3)(x - 1) = 0$ $x = 1$ and $x = 3$ (both) $y = -3$ and $y = -1$ (both)	P1 K1 Eliminate x/y K1 Solve quadratic equation N1 N1
		5
2	(a) $g[f(x)] = x^2 + 6x + 5$ $[f(x)]^2 - 4 = x^2 + 6x + 5$ $[f(x)]^2 = (x + 3)^2$ $f(x) = x + 3$ (b) (i) $k^{-1}(x) = \frac{x + 4}{3}$ $k^{-1}(5) = \frac{5 + 4}{3} = 3$ (ii) $k^{-1}(p) = \frac{p + 4}{3} = 2$ $p = 2$	K1(find composite function) N1 N1 K1(find inverse function) N1 K1 N1
		7
3	(a) $f(x) = x^2 - 10x + 12$ $= (x - 5)^2 - 13$ $2x^2 + 9x - 8 = 0$ (b) $\alpha + \beta = -\frac{9}{2}$ $\alpha\beta = 4$ $sor = 3\alpha + 3\beta$ $por = 9\alpha\beta$ $= 3\left(-\frac{9}{2}\right)$ $= 9(4)$ $= -\frac{27}{2}$ $= 36$	P1 P1 P1 K1 N1 N1
		6

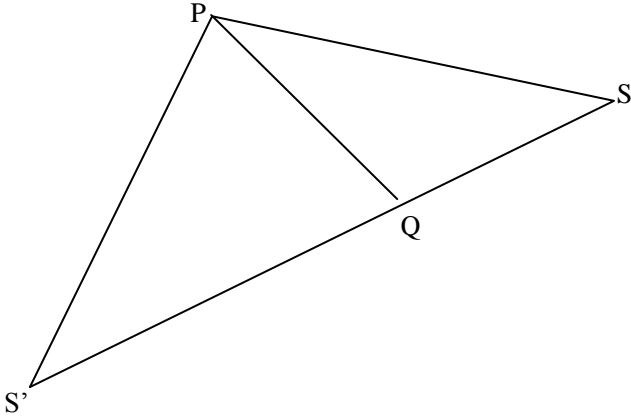
<p>4</p> <p>(a)</p> <p>(i) $\overline{OR} = \overline{OC} + \overline{CR}$ $= 6\tilde{x} + 3\tilde{y}$</p> <p>(ii) $\overline{QR} = \frac{2}{5}\overline{OR}$ $= \frac{2}{5}(6x + 3y)$ $= \frac{12}{5}\tilde{x} + \frac{6}{5}\tilde{y}$</p> <p>(iii) $\overline{BR} = \overline{BQ} + \overline{QR}$ $= 6\tilde{x} - \tilde{y}$</p> <p>(b) $\overline{BR} = h\overline{OC}$ <i>cannot find h.</i> <i>not parallel</i></p>		<p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1 find h</p> <p>N1</p>
		8
<p>5</p> <p>(a)</p> <p>(i) $5 = \frac{\sum x}{8}$</p> <p>(ii) $9 = \frac{\sum x^2}{8} - 5^2$</p> <p>(b)</p> <p>new mean = $3(5) + 5 = 20$</p> <p>new standard deviation = $3(3) = 9$</p>		<p>P1</p> <p>K1</p> <p>N1</p> <p>K1 N1</p> <p>K1 N1</p>
		7

<p>6 (a)</p>	$\frac{1}{2}p^2, \frac{1}{8}p^2, \frac{1}{32}p^2, \dots$ $\frac{\frac{1}{8}p^2}{\frac{1}{2}p^2} = \frac{\frac{1}{32}p^2}{\frac{1}{8}p^2}$ $r = \frac{1}{4}$	<p>K1</p> <p>K1</p> <p>N1</p>
<p>(b)</p>	<p>(i)</p> $3200\left(\frac{1}{4}\right)^{n-1} = \frac{25}{128}$ $n = 8$ <p>(ii)</p> $S_{\infty} = \frac{3200}{1 - \frac{1}{4}}$ $4266\frac{2}{3}$	<p>K1K1</p> <p>N1</p> <p>K1</p> <p>N1</p>
		<p>8</p>

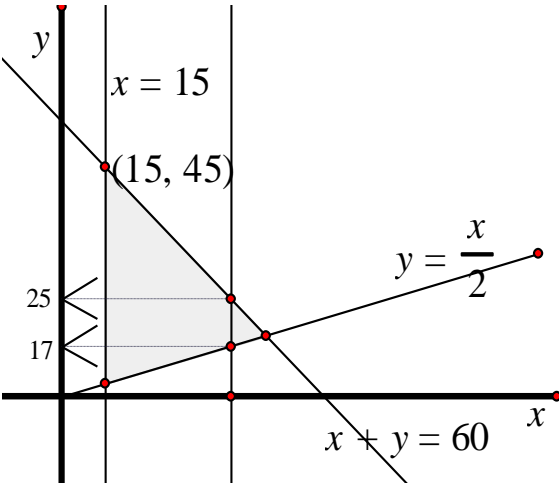
7																
(a)	<table border="1"> <tr> <td>x</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> <td>5</td> <td>6</td> </tr> <tr> <td>$\log_{10} y$</td> <td>0.47</td> <td>0.61</td> <td>0.76</td> <td>0.91</td> <td>1.05</td> <td>1.20</td> </tr> </table>	x	1	2	3	4	5	6	$\log_{10} y$	0.47	0.61	0.76	0.91	1.05	1.20	N1 6 correct values of $\log y$
x	1	2	3	4	5	6										
$\log_{10} y$	0.47	0.61	0.76	0.91	1.05	1.20										
(b)		K1 Plot $\log_{10} y$ vs x . Correct axes & uniform scale N1 6 points plotted correctly N1 Line of best-fit														
(c)	$\log_{10} y = x \log_{10} k + \log_{10} h$	P1														
(i)	$\log_{10} k =$ *gradient $h = 1.40$	K1 N1														
(ii)	$\log_{10} h =$ *y-intercept $h = 2.09$	K1 N1														
(iii)	$y = 6.76$	N1														
		10														

N0.	SOLUTION	MARKS
<p>8</p> <p>(a)</p> <p>$\sin \frac{1}{2}\theta = \frac{4}{6}$</p> <p>$\theta = 1.46 \text{ rad}$</p> <p>(b)</p> <p>$S_{EF} = 6(1.46)$</p> <p>$= 8.76 \text{ cm}$</p> <p>Perimeter = $8.76 + 2(6) + 2(6) + 2(8)$</p> <p>$= 48.76 \text{ cm}$</p> <p>(c)</p> <p>Area of sector OEF = $\frac{1}{2}(6)^2(1.46) = 26.28$</p> <p>Area of rectangle = 48</p> <p>Area of the shaded region = $48 - 26.28$</p> <p>$= 21.72 \text{ cm}^2$</p>	<p>K1</p> <p>N1</p> <p>K1 Use $s = r\theta$</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>K1</p> <p>N1</p>	<p>10</p>
		<p>10</p>

N0.	SOLUTION	MARKS
<p>9</p> <p>(a)</p> <p>$x^2 = 2x - 8$</p> <p>$x = -2, x = 4$</p> <p>$P(-2, 4),$</p> <p>$Q(4, 16)$</p> <p>(b)</p> $A = \int_{-2}^4 [(2x+8) - x^2] dx$ $= \left[x^2 + 8x - \frac{x^3}{3} \right]_{-2}^4$ $= \left[(4)^2 + 8(4) - \frac{(4)^3}{3} \right] - \left[(-2)^2 + 8(-2) - \frac{(-2)^3}{3} \right]$ $= 36$ <p><i>Note : If use area of trapezium and $\int y dx$, give marks accordingly.</i></p> <p>(c)</p> $V = \pi \int_0^4 (x^2)^2 dx$ $= \pi \left[\frac{x^5}{5} \right]_0^4$ $= 204 \frac{4}{5} \pi \quad \text{or } 204.8\pi$	<p>K1 for solving quad.eqn.</p> <p>N1</p> <p>N1</p> <p>K1 use</p> $\int (y_2 - y_1) dx$ <p>K1 integrate correctly</p> <p>K1 Sub. the limit correctly</p> <p>N1</p> <p>K1 correct limit</p> <p>K1 integrate correctly</p> <p>N1</p>	<p>10</p>
		<p>10</p>

N0.	SOLUTION	MARKS
11	<p>i) $\frac{\sin QPS}{8} = \frac{\sin 106^\circ}{12}$ $\angle QPS = 39.8546^\circ$ $= 39.85^\circ$ $\angle QSP = 180^\circ - 106^\circ - 39.8546^\circ$ $= 34.15^\circ$</p> <p>ii) $Luas \Delta PQS = \frac{1}{2} \times 8 \times 12 \times \sin 34.15^\circ$ $= 26.95 \text{ cm}^2$</p> <p>iii) $(RS)^2 = 8^2 + 9^2 - 2 \times 8 \times 9 \times \cos 39^\circ$ $RS = 5.75 \text{ cm}$</p> <p>b)i)</p>  <p>ii)</p> $\frac{QS'}{\sin 71.85^\circ} = \frac{12}{\sin 74^\circ}$ $QS' = 11.86 \text{ cm}$	<p>K1</p> <p>N1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p>
		10

N0.	SOLUTION	MARKS
12	<p>a) Perbelanjaan bahan api A tahun 2010 = $\frac{100}{135} \times 6000$ = RM 4 444.44</p> <p>27+46+27 can be seen</p> <p>b) Indeks gubahan = $\frac{135(27) \times 120(46) \times 105(27)}{100}$ = 120</p> <p>c) Perbelanjaan bahan api 2010 = $\frac{120}{100} \times 30\ 000$ = 36 000</p> <p>d) Indeks harga bahan api 2013 $I_A = 135$ $I_B = 120 \times \frac{135}{100} = 162$ $I_C = 105 \times \frac{130}{100} = 136.5$ Indeks gubahan pada tahun 2013 berasaskan tahun 2008 = $\frac{135(27) + 162(46) + 136.5(27)}{100}$ = 147.83</p>	<p>K1 N1</p> <p>P1</p> <p>K1 N1</p> <p>K1 N1</p> <p>P1 ($I_A=135$ OR $I_B = 162$ OR $I_C=136.5$)</p> <p>K1</p> <p>N1</p>
		10

N0.	SOLUTION	MARKS
13	<p>a) Tiga ketaksamaan :</p> <p>i. $x + y \leq 60$</p> <p>ii. $x \leq 2y$</p> <p>iii. $x \geq 15$</p> <ul style="list-style-type: none"> • At least one straight line is drawn correctly from inequalities involving x and y. K1 • All the three straight lines are drawn correctly. K1 • Region is correctly shaded. N1  <p>c) i.) Bilangan maksimum skrew = 25 kotak N1</p> <p>(ii) Titik maksimum (15,45) P1 Keuntungan maksimum; K1 $30x + 35y = k$ $30(15) + 35(45) = k$ N1 $k = \text{RM2 025}$</p>	<p style="text-align: center;">N1</p> <p style="text-align: center;">N1</p> <p style="text-align: center;">N1</p> <p style="text-align: center;">K1</p> <p style="text-align: center;">K1</p> <p style="text-align: center;">N1</p> <p style="text-align: center;">N1</p> <p style="text-align: center;">P1</p> <p style="text-align: center;">K1</p> <p style="text-align: center;">N1</p> <p style="text-align: center;">10</p>
		10

END OF MARKING SCHEME