

3472/1
Matematik
Tambahan
Kertas 1
2 Jam



KEMENTERIAN PENDIDIKAN
JABATAN PENDIDIKAN NEGERI PERAK

SEKTOR PEMBELAJARAN NEGERI PERAK
JABATAN PENDIDIKAN NEGERI PERAK
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SKEMA JAWAPAN MODUL GEMPUR SPM
TAHUN 2022

MATEMATIK TAMBAHAN
Kertas 1
Set 1
Dua Jam

SOALAN	BUTIRAN	MARKAH	JUMLAH
1	$\delta x = -10$ atau $\frac{dV}{dx} = 7500$	1	3
	$7500 \times (-10)$	1	
	-75000	1	

SOALAN	BUTIRAN	MARKAH	JUMLAH
2(a)	$9.24 = 7.34 \times \theta$ $\theta = 1.2589$ radian $\theta = 1.2589 \times \frac{180}{3.142}$ $\theta = 72.12^\circ$	1 1	4
(b)	Perentas PQ/Chord PQ $PQ^2 = (7.34)^2 + (7.34)^2 - 2(7.34)(7.34) \cos 72.12^\circ$ Perimeter = $8.6411 + 9.24$ $= 17.88$ cm	1 1	

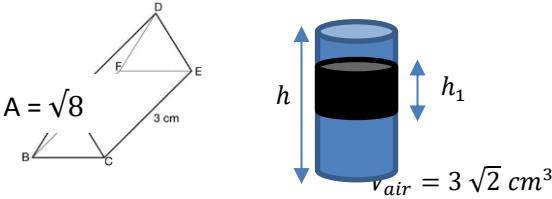
SOALAN	BUTIRAN	MARKAH	JUMLAH
3(a)	Katakan $P(x, y)$ ialah titik pada rel yang baru. C : Chow Kit A : Ampang Park $PC = PA$ $\sqrt{[x - (-1.5)]^2 + (y - 2.5)^2} = \sqrt{(x - 2)^2 + (y - 4)^2}$ $x^2 + 3x + 2.25 + y^2 - 5y + 6.25 = x^2 - 4x + 4 + y^2 - 8y + 16$ $7x + 3y - 11.5 = 0$	1,1 1 1	6
(b)	Batu Cave $(-4, 12)$ $7(-4) + 3y - 11.5 = 0$ $y = \frac{43}{3} \neq 12$ Dang Wangi $(2.5, -2)$ $7(2.5) + 3y - 11.5 = 0$ $y = -2$ Dang Wangi kerana koordinat berada di atas lokus.	Ganti kedua-dua koordinat 1 1	

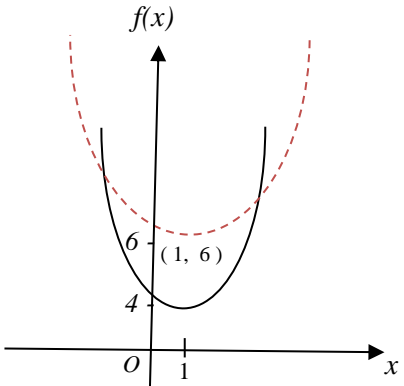
SOALAN	BUTIRAN	MARKAH	JUMLAH
4(a)	$T_{10} = 7 + (10 - 1)(4)$ $T_{10} = 43$	1 1	5
(b)	$S_{10} = \frac{10}{2} [(2)(7) + (10 - 1)(4)]$ $S_{10} = 250$ Tidak dapat	1 1 1	

SOALAN	BUTIRAN	MARKAH	JUMLAH
5(a)	$\int 24(4x - 3)^5 dx = (4x - 3)^6 \times \frac{1}{8}$ $\int 3(4x - 3)^5 dx = \frac{1}{8}(4x - 3)^6 + c$	1 1	5
(b)	$\left[\frac{x^2}{2(x+3)} \right]_1^2$ $\frac{2^2}{2(2+3)} - \frac{1^2}{2(1+3)}$ $\frac{11}{40}$	1 1 1	

SOALAN	BUTIRAN	MARKAH	JUMLAH
6(a)	$m = 3(3) - 5 = 4$	1	5
(b)	$gf(x) = 6 - 9x$ $g(3x - 5) = 6 - 9x$ <i>let</i> $y = 3x - 5$ $x = \frac{y+5}{3}$ $g(x) = 6 - 9\left(\frac{y+5}{3}\right)$ $g(x) = -9 - 3x$ <i>bandingkan dengan</i> $g(x) = p - qx$ $p = -9$ $q = 3$	1 1 1 1	

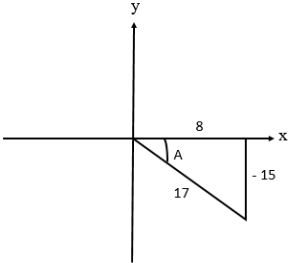
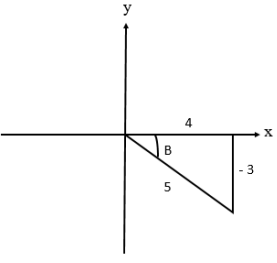
SOALAN	BUTIRAN	MARKAH	JUMLAH
7(a)		1	6
(b)	$\log_{10} y = \frac{h}{6}(6x) + 5k$ $5k = 15$ $k = 3$ $\frac{15 - 2}{0 - 6} = \frac{h}{6}$ $h = -13$	1 1 1 1 1	

SOALAN	BUTIRAN	MARKAH	JUMLAH
8(a)	 <p> $A = \sqrt{8}$ $V_{Prisma} = 3\sqrt{8} \text{ cm}^3$ $V_{Prisma} = V_{silinder} - V_{asal \text{ air}}$ $V_{prisma} = \pi r^2 h - 3\sqrt{2}\pi r^2$ $3\sqrt{8} = \pi r^2 h - 3\sqrt{2}\pi r^2$ $3\sqrt{8} = \pi r^2 (h - 3\sqrt{2})$ $h - 3\sqrt{2} = \frac{3\sqrt{8}}{\pi r^2}$ </p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	4
(b)	<p> $V_{kubus} = V_{silinder} - V_{air} \text{ (baru)}$ $(\sqrt{2}x)^3 = \pi r^2 h - \pi r^2 h_1$ $\sqrt{8}x^3 = \pi r^2 (h - h_1)$ $h - h_1 = \frac{\sqrt{8}x^3}{\pi r^2}$ $\frac{\sqrt{8}x^3}{\pi r^2} = 1.08 \left(\frac{3\sqrt{8}}{\pi r^2} \right)$ $\frac{x^3}{3} = 1.08$ $x = 1.5 \text{ cm}$ $h - 3\sqrt{2} = \frac{3\sqrt{8}}{\pi(3)^2}$ $h = 4.4 \text{ cm}$ </p>	<p>1</p> <p>1</p> <p>1</p>	3

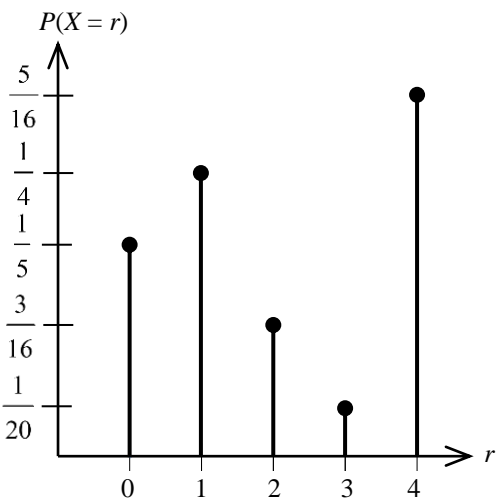
SOALAN	BUTIRAN	MARKAH	JUMLAH
9(a)	Titik minimum (1, 4) Persamaan paksi simetri, $x = 1$	1 1	6
(b)	 <p>Lakaran graf yang betul</p>	1	
	(i) Apabila nilai a berubah dari 4 ke 2, kelebaran graf bertambah	1	
	(ii) Apabila nilai k berubah dari 4 ke 6, graf bergerak menegak 2 unit ke atas, nilai minimumnya menjadi 6 dan persamaan paksi simetrinya masih sama iaitu, $x = 1$	1 1	

SOALAN	BUTIRAN	MARKAH	JUMLAH
10(a)	<p>Halaju paduan kapal Ahmad, $A = \underline{v} + \underline{a}$ $V_A = 2\underline{i} + \frac{1}{2}\underline{j} + 5\underline{i} + 3\underline{j}$ $V_A = 7\underline{i} + \frac{7}{2}\underline{j}$ $V_A = 7\left(\underline{i} + \frac{1}{2}\underline{j}\right) \dots\dots\dots(i)$</p> <p>Halaju paduan kapal Ben, $B = \underline{v} + \underline{b}$ $V_B = 2\underline{i} + \frac{1}{2}\underline{j} + 3\underline{i} + 2\underline{j}$ $V_B = 5\underline{i} + \frac{5}{2}\underline{j}$ $V_B = 5\left(\underline{i} + \frac{1}{2}\underline{j}\right) \dots\dots\dots(ii)$</p> <p>$\frac{1}{7}V_A = \frac{1}{7}V_A = \underline{i} + \frac{1}{2}\underline{j}$ dan $\frac{1}{5}V_B = \underline{i} + \frac{1}{2}\underline{j}$</p>	1 1 1	6

	$\frac{1}{7}V_A = \frac{1}{5}V_B$ $V_A = \frac{7}{5}V_B$ $V_A = 1\frac{2}{5}V_B$ <p>Halaju paduan kapal layar Ahmad adalah $1\frac{2}{5}$ ganda halaju paduan kapal layar Ben.</p>		
(b)	<p>Halaju paduan kapal Chong,</p> $C = \underline{v} + \underline{c}$ $V_C = 2\underline{i} + \frac{1}{2}\underline{j} + 3\underline{i} - \frac{3}{2}\underline{j}$ $V_C = 5\underline{i} - \underline{j}$ <p>Magnitud kapal Chong</p> $= 5\underline{i} - \underline{j} $ $= \sqrt{5^2 + (-1)^2}$ $= \sqrt{26}$	1	1

SOALAN	BUTIRAN	MARKAH	JUMLAH
11(a)	<p data-bbox="233 127 417 156">Dalam sukuan iv</p> <div style="display: flex; justify-content: space-around; align-items: center;">   </div> <p data-bbox="233 450 552 523">$\sin A = -\frac{15}{17}$, $\tan A = -\frac{15}{8}$</p> <p data-bbox="619 450 884 523">$\sin B = -\frac{3}{5}$, $\cos B = \frac{4}{5}$</p> <p data-bbox="233 566 588 1039"> $\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$ $= \frac{-\frac{15}{8} - (-\frac{3}{4})}{1 + (-\frac{15}{8})(-\frac{3}{4})}$ $= \frac{(-\frac{9}{8})}{(\frac{77}{32})}$ $= -\frac{36}{77}$ </p>	<p data-bbox="999 469 1013 488">1</p> <p data-bbox="999 716 1013 736">1</p> <p data-bbox="999 991 1013 1010">1</p>	5
(b)	<p data-bbox="233 1074 505 1373"> $\sin\left(\frac{1}{2}A\right) = \sqrt{\frac{1 - \cos A}{2}}$ $= \sqrt{\frac{1 - \frac{8}{17}}{2}}$ $= \frac{3}{\sqrt{34}}$ </p> <p data-bbox="233 1416 529 1619"> $\operatorname{kosek}\left(\frac{1}{2}A\right) = \frac{1}{\left(\sin\frac{1}{2}A\right)}$ $= \frac{\sqrt{34}}{3}$ </p>	<p data-bbox="999 1228 1013 1248">1</p> <p data-bbox="999 1566 1013 1586">1</p>	

SOALAN	BUTIRAN	MARKAH	JUMLAH														
12(a)	$6!$ atau $6 \times 5 \times 4 \times 3 \times 2 \times 1$ 720	1 1	6														
(b)	Bilangan cara menempatkan Aliff dan Balqis: <table border="1" style="margin: 10px auto;"> <thead> <tr> <th>Stesen kerja Aliff</th> <th>Stesen kerja Balqis</th> </tr> </thead> <tbody> <tr> <td>P</td> <td>R, T, U</td> </tr> <tr> <td>Q</td> <td>U, S</td> </tr> <tr> <td>R</td> <td>P, S, T</td> </tr> <tr> <td>U</td> <td>P, Q, S</td> </tr> <tr> <td>T</td> <td>P, R</td> </tr> <tr> <td>S</td> <td>Q, R, U</td> </tr> </tbody> </table> $3 + 2 + 3 + 3 + 2 + 3$ 16 $16 \times 4 \times 3 \times 2 \times 1$ 384	Stesen kerja Aliff		Stesen kerja Balqis	P	R, T, U	Q	U, S	R	P, S, T	U	P, Q, S	T	P, R	S	Q, R, U	1 1 1 1
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SOALAN	BUTIRAN	MARKAH	JUMLAH				
13(a)	<table border="1" style="margin: 10px auto;"> <tr> <td style="text-align: center;">Pemboleh ubah rawak diskret</td> <td style="text-align: center;">Pemboleh ubah rawak selanjar</td> </tr> <tr> <td style="text-align: center;">II, III</td> <td style="text-align: center;">I, IV</td> </tr> </table>	Pemboleh ubah rawak diskret	Pemboleh ubah rawak selanjar	II, III	I, IV	1, 1	8
Pemboleh ubah rawak diskret	Pemboleh ubah rawak selanjar						
II, III	I, IV						
(b)(i)	$\frac{p-3}{5} + \frac{p-2}{8} + \frac{3}{16} + \frac{2p-7}{20} + \frac{p+1}{16} = 1$	1					
	4	1					
(ii)	$\frac{1}{5} + \frac{1}{20} + \frac{5}{16}$	1					
	$\frac{9}{16}$	1					
(iii)		1, 1					

SOALAN	BUTIRAN	MARKA H	JUMLAH																																	
14 (a)	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;"></th> <th style="width: 30%; text-align: center;">sebutan ke-n $n^{\text{th}} \text{ term}$</th> <th style="width: 30%; text-align: center;">$r \times$ sebutan ke-n $r \times n^{\text{th}} \text{ term}$</th> </tr> </thead> <tbody> <tr> <td></td> <td style="text-align: center;">$T_1 = a$</td> <td style="text-align: center;">$rT_1 = ar$</td> </tr> <tr> <td></td> <td style="text-align: center;">$T_2 = ar$</td> <td style="text-align: center;">$rT_2 = ar^2$</td> </tr> <tr> <td></td> <td style="text-align: center;">$T_3 = ar^2$</td> <td style="text-align: center;">$rT_3 = ar^3$</td> </tr> <tr> <td></td> <td style="text-align: center;">$T_4 = ar^3$</td> <td style="text-align: center;"> \vdots</td> </tr> <tr> <td></td> <td></td> <td style="text-align: center;">$rT_{n-2} = ar^{n-2}$</td> </tr> <tr> <td></td> <td style="text-align: center;">$T_{n-1} = ar^{n-2}$</td> <td style="text-align: center;">$rT_{n-1} = ar^{n-1}$</td> </tr> <tr> <td></td> <td style="text-align: center;">$T_n = ar^{n-1}$</td> <td style="text-align: center;">$rT_n = ar^n$</td> </tr> <tr> <td style="text-align: center;">Hasil tambah <i>Sum</i></td> <td style="text-align: center;">S_n (1)</td> <td style="text-align: center;">$r S_n$ (2)</td> </tr> <tr> <td style="text-align: center;">Hasil tambah n sebutan pertama, S_n</td> <td style="text-align: center;">(1) – (2)</td> <td style="text-align: center;">(2) – (1)</td> </tr> <tr> <td style="text-align: center;"><i>Sum of first n terms, S_n</i> ↓ dengan where n ialah integer positif, n is a integer positive, $n > 0 @ n \geq 1$</td> <td style="text-align: center;">$S_{n=\frac{a(1-r^n)}{1-r}}$ biasanya digunakan apabila <i>commonly used when</i> $r < 1 \rightarrow -1 < r < 1$</td> <td style="text-align: center;">$S_{n=\frac{a(r^n-1)}{r-1}}$ biasanya digunakan apabila <i>commonly used when</i> $r > 1 \rightarrow r < -1, r > 1$</td> </tr> </tbody> </table>		sebutan ke- n $n^{\text{th}} \text{ term}$	$r \times$ sebutan ke- n $r \times n^{\text{th}} \text{ term}$		$T_1 = a$	$rT_1 = ar$		$T_2 = ar$	$rT_2 = ar^2$		$T_3 = ar^2$	$rT_3 = ar^3$		$T_4 = ar^3$	\vdots			$rT_{n-2} = ar^{n-2}$		$T_{n-1} = ar^{n-2}$	$rT_{n-1} = ar^{n-1}$		$T_n = ar^{n-1}$	$rT_n = ar^n$	Hasil tambah <i>Sum</i>	S_n (1)	$r S_n$ (2)	Hasil tambah n sebutan pertama, S_n	(1) – (2)	(2) – (1)	<i>Sum of first n terms, S_n</i> ↓ dengan where n ialah integer positif, n is a integer positive, $n > 0 @ n \geq 1$	$S_{n=\frac{a(1-r^n)}{1-r}}$ biasanya digunakan apabila <i>commonly used when</i> $ r < 1 \rightarrow -1 < r < 1$	$S_{n=\frac{a(r^n-1)}{r-1}}$ biasanya digunakan apabila <i>commonly used when</i> $ r > 1 \rightarrow r < -1, r > 1$	<p>Semua sebutan ke-n betul- 1</p> <p>semua $r \times$ sebutan ke-n betul -1</p> <p style="text-align: center;">1,1</p>	8
	sebutan ke- n $n^{\text{th}} \text{ term}$	$r \times$ sebutan ke- n $r \times n^{\text{th}} \text{ term}$																																		
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(b)	<p style="text-align: center;">$a = 18\ 000$ $r = 1.05$ $S_5 = \frac{18000(1.05^5-1)}{1.05-1}$</p> <p style="text-align: center;">$S_5 = RM\ 99\ 461$</p> <p style="text-align: center;">$Simpanan = 25\% \times 99\ 461 = RM\ 24\ 865$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>																																		

SOALAN	BUTIRAN	MARKAH	JUMLAH
15(a)	$\frac{dy}{dx} = 12x^2 - 24x + 9$ $\frac{d^2y}{dx^2} = 24x - 24$	<p>1</p> <p>1</p>	8
(b)	$\frac{dy}{dx} = 0$ $(6x - 3)(2x - 3) = 0$ $x = \frac{1}{2}, x = \frac{3}{2}$ $y = -2, y = -4$ $\left(\frac{1}{2}, -2\right), \left(\frac{3}{2}, -4\right)$ $\left(\frac{1}{2}, -2\right), \frac{d^2y}{dx^2} = 24\left(\frac{1}{2}\right) - 24 = -12 < 0$ <p>Titik maksimum</p> $\left(\frac{3}{2}, -4\right), \frac{d^2y}{dx^2} = 24\left(\frac{3}{2}\right) - 24 = 12 > 0$ <p>Titik minimum</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p>	