3472/2
Percubaan
SPM
Matematik
Tambahan
Kertas 2
Peraturan
Pemarkahan
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PERCUBAAN SPM TAHUN 2021

MATEMATIK TAMBAHAN
Tingkatan 5

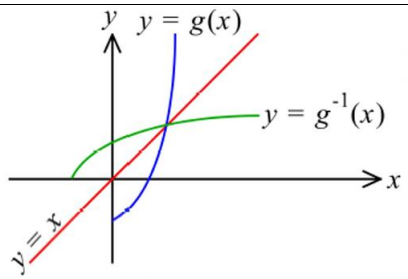
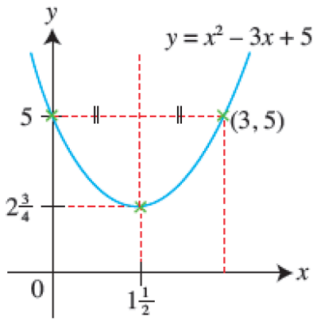
KERTAS 2

PERATURAN PEMARKAHAN

SET 2

UNTUK KEGUNAAN PEMERIKSA SAHAJA

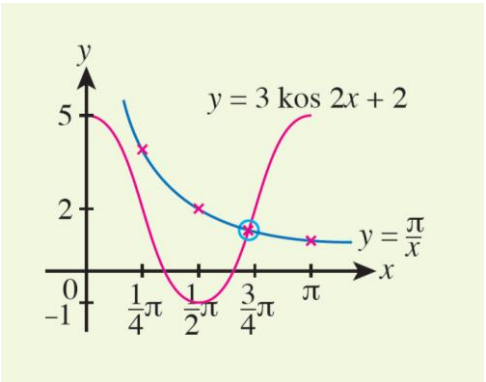
PERATURAN PERMARKAHAN KERTAS 2 SET 2

No		JAWAPAN	MARKAH	
1	(a)		P1 P1	2
	(b)	Garis mengufuk memotong graf *g(x)* hanya pada satu titik dalam domain yang diberi. Oleh itu $g(x)^{-1}$ wujud	N1 N1	2
	(c) (i) (ii)	$g(x)^{-1} = \sqrt{2x+1}$ $-\frac{1}{2} \leq x \leq 4$ $0 \leq g(x)^{-1} \leq 3$	N1 N1 N1	3
			7 M	
2		$x^2 - 3x + \left(-\frac{3}{2}\right)^2 + 5 - \left(-\frac{3}{2}\right)^2$ $\left(x - \frac{3}{2}\right)^2 + \frac{11}{4}$	K1 N1	
	(a)	Nilai minimum = $\frac{11}{4}$	N1	
	(b)	Nilai minimum wujud bila $\left(x - \frac{3}{2}\right)^2 = 0$ Maka $x = \frac{3}{2}$	N1	
	(c)	Koordinat titik minimum = $(\frac{3}{2}, \frac{11}{4})$  $(-3)^2 - 4(1)(5) = -11 < 0$ Bentuk Titik minimum Pintasan y dan titik (3,5)	K1 P1 P1 P1	
			8M	

3	(a)	2975 , 2950, 2925, 2900, ... a = 2975 , d = - 25 2975 + (n-1)(-25) = 2000 n = 40	P1 K1 N1	3
	(b)	$(2975 \times 0.15), (2950 \times 0.15), (2925 \times 0.15), \ldots$ a = 446.25 , d = - 3.75 $S_{40} = \frac{40}{2}[2(446.25) + (40-1)(-3.75)]$ = RM14 925	K1 P1 K1 N1	4
			7M	
4		Katakan a = kilang A b = kilang B c = kilang C. $10a + 20b + 40c = 640$ ….(1) $20a + 15b + 45c = 750$ …(2) $5a + 35b + 30c = 650$ …(3) (3) x 2: $10a + 70b + 60c = 1300$ …$(3a)$ (3) x 4: $20a + 140b + 120c = 2600$ …$(3b)$ (3a) – (1): $5b + 2c = 66$ …(4) (3b) – (2): $5b + 3c = 74$ …(5) (5) – (4): $c = 8$ Gantikan nilai c = 8 dalam (4) $5b + 2(8) = 66$ $b = 10$ Gantikan nilai c = 8 dan b = 10 dalam (1) $5a + 35(10) + 30(8) = 650$ $a = 12$ • 3 persamaan betul 2M • 2 persamaan betul 1M • Gunakan kaedah penggantian atau penghapusan 1M • a =12 hari 1M • b = 10 hari 1M • c = 8 hari 1M	P1 P1 K1 N1 N1 N1	
			6	

5	(a)	$\frac{\log_2 125}{\log_2 8} = \log_2 u$ $\log_2 (5^3)^{\frac{1}{3}} = \log_2 u$ $u = 5$	K1 K1 N1	3
	(b)	$\frac{1}{2}(9\sqrt{3}-1) = \frac{1}{2}\left(2\sqrt{3}+\frac{1}{2}\right)(h)$ $h = \frac{\frac{1}{2}(9\sqrt{3}-1)}{\sqrt{3}+\frac{1}{2}} \times \frac{\sqrt{3}-\frac{1}{2}}{\sqrt{3}-\frac{1}{2}}$ $\frac{11}{4}(5-\sqrt{3}) \times \frac{4}{11}$ $5-\sqrt{3}$	K1 K1 K1 N1	4
			7	
6	(a)	(i) $\overrightarrow{MB} = \overrightarrow{MO} + \overrightarrow{OB}$ $= -2\underset{\sim}{a} + 8\underset{\sim}{b}$ • Hukum segitig di gunakan Di (i) , (ii) atau (iii)P 1 M (ii) $\overrightarrow{AP} = \propto (\overrightarrow{AO} + \overrightarrow{ON})$ $= \propto \left(-4\underset{\sim}{a} + \frac{5}{8}(8\underset{\sim}{b})\right)$ $= -4 \propto \underset{\sim}{a} + 5 \propto \underset{\sim}{b}$ (iii) $\overrightarrow{MP} = \overrightarrow{MA} + \overrightarrow{AP}$ $= 2\underset{\sim}{a} - 4 \propto \underset{\sim}{a} + 5 \propto \underset{\sim}{b}$ $= (2 - 4 \propto)\underset{\sim}{a} + 5 \propto \underset{\sim}{b}$	K1 N1 K1 N1 N1	5
	(b)	Katakan $\overrightarrow{MP} = \mu \overrightarrow{MB}$ $(2 - 4 \propto)\underset{\sim}{a} + 5 \propto \underset{\sim}{b} = -2\mu\underset{\sim}{a} + 8\mu\underset{\sim}{b}$ Bandingkan pekali $\underset{\sim}{a}$ dan $\underset{\sim}{b}$: $(2 - 4 \propto) = -2\mu$, $\rightarrow (1)$ $5 \propto = 8\mu$, $\mu = \frac{5}{8} \propto$ $\rightarrow (2)$ Gantikan (2) dalam (1): $\propto = \frac{8}{11}$ • Bandingkan pekali 1m • Selesaikan persamaan 1M	K1 K1 N1	3
			8	

7	(a)	$m_A\, m_B = -1$ $m_B = \frac{-6-8}{2-3} = 14$ $m_A = \frac{-1}{14}$ $y - 5 = \frac{-1}{14}(x-(-1))$ $14y + x = 69$	K1 K1 N1	3
	(b)	$\frac{1}{2}\begin{vmatrix} -3 & 0 & 6 & -3 \\ 4 & 0 & -2 & 4 \end{vmatrix}$ 9	K1 N1	2
	(c)	$\left(\frac{(-3\times 2)+(3\times 6)}{3+2}, \frac{(4\times 2)+(-2\times 3)}{3+2}\right)$ $\left(\frac{12}{5}, \frac{2}{5}\right)$	K1 N1	2
			7	
8	(a)	i) $0 = 27 - (x-2)^3$ $-27 = -(x-2)^3$ $3^3 = (x-2)^3$ $x = 5\ koordinat\ (5,0)$ ii) $\int_0^5 27 - (x-2)^3\, dx$ $\left[27x - \frac{(x-2)^4}{4}\right]_0^5$ $\left[27(5) - \frac{((5)-2)^4}{4}\right]_0^5 - 0$ $115.25\ unit^2$	K1 K1 N1 K1 K1 N1	3 3

	(b)	$\pi \int_k^4 (\sqrt{3x+4})^2\, dx = \pi \int_k^4 3x+4\, dx = 26\,\pi$ $\pi \left[\frac{3x^2}{2} + 4x\right]_k^4 = 26\,\pi$ $\left[\frac{3(4)^2}{2} + 4(4)\right] - \left[\frac{3(k)^2}{2} + 4(k)\right] = 26$ $-3k^2 - 8k + 28 = 0$ $k = 2$	K1 K1 K1 N1	4
			10	
9	(a)	$sin\,90°\,kos\,A + kos\,90°\,sin\,A$ $(1)kos\,A + (0)\,sin\,A$	K1 N1	2
	(b)	<table><tr><td>x</td><td>0</td><td>$\frac{\pi}{4}$</td><td>$\frac{\pi}{2}$</td><td>$\frac{3\pi}{4}$</td><td>π</td></tr><tr><td>y</td><td>5</td><td>2</td><td>-1</td><td>2</td><td>5</td></tr></table>  *3x kos 2x + 2x = π* *x (3 kos 2x + 2) = π* *3 kos 2x + 2 =* $\frac{\pi}{x}$ *y =* $\frac{\pi}{x}$. *Bilangan penyelesaian = 1*	P1 P1 P1 K1 N1	5

	(c)	$kosx(2sinx+1)=0$ $kosx=0, \quad 2sinx+1=0$ $x=90°, \quad x=270°$ $x=180°+30°, \quad x=360°-30°$	K1 N1 N1	3
			10	

NO		JAWAPAN	MARKAH	
10	(a)(i)	p=0.2 atau q=0.8 $P(X \geq 2) = 1 - P(X=0) - P(X=1)$ $= 1 - {}^{10}C_0(0.2)^0(0.8)^{10} - {}^{10}C_1(0.2)\ (0.8)^9$ $= 0.6242$ Atau setara	**P1** **K1** **NI**	
	(ii)	$130 = n(0.2)(0.8)$ $n = 813$	**K1** **N1**	5
	(b)(i)	$P(X > 1.2)$ $= P\left(Z < \frac{1.2-2.2}{0.9}\right)$ = 0.8667	**K1** **NI**	
	(ii)	$P\left(Z < \frac{m-2.2}{0.9}\right) = 0.87$ atau $P\left(Z > \frac{m-2.2}{0.9}\right) = 0.13$ $\frac{m-2.2}{0.9} = 1.126$ $m = 1.126$	**K1** **K1** **N1**	5
			10	

NO		JAWAPAN	MARKAH	
11	(a)	<table><tr><td>x</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td></tr><tr><td>$\frac{y}{x}$</td><td>6.35</td><td>7.10</td><td>7.72</td><td>8.50</td><td>9.27</td><td>9.99</td></tr></table>	N1	1
	(b)	(correct axes and uniform scales) All points are plotted correctly Line of best fit	P1 P1 P1	3
	(c)	$\frac{y}{x} = 4px + \frac{p}{q}$ (i) From the graph, when $x = 3.3$ $\frac{y}{x} = 7.3$ $y = 24.09$ **refer to student's graph (ii) Gradient / *kecerunan*, $4p = 0.7$ $p = 0.175$ (iii) $\frac{p}{q}$ = *Y*–intercept $\frac{0.175}{q} = 5$ $q = 0.035$	P1 N1 K1 N1 K1 N1	6
			10	

NO		JAWAPAN	MARKAH	
12	(a)	8	N1	
	(b)	Differentiate $8 + 2t - t^2$ $a = 2 - 2t$ $t = 1$ $v = 9$	K1 N1 N1	4

	(c)	$8 + 2t - t^2 < 0$ $t > 4$ $a = -6$	K1 N1 N1	3
	(d)	$\int 8 + 2t - t^2$ $s = 8t + t^2 - \frac{t^3}{3}$ Substitute $t = 4$ and $t = 5$ into $s = 8t + t^2 - \frac{t^3}{3}$ 30	K1 K1 N1	3
			10 M	
NO		**JAWAPAN**	**MARKAH**	
13	(a)	$\frac{x}{1.6} \times 100 = 125$ x = RM2.00	K1 N1	2
	(b)	$z = y + 0.22$ $\frac{y+0.22}{y} \times 100 = 120$ y = RM1.10 z = RM1.32	K1 N1 N1	3
	(c)	(i) $\frac{7.70}{P_{20}} \times 100 = 140$ P_{20} = RM5.50 (ii) seen 140 or 150 $140 = \frac{(125\times2)+(140\times2)+(120\times1)+(150\times k)}{2+2+1+k}$ $k = 5$	K1 N1 P1 K1 N1	5
			10	

NO		JAWAPAN	MARKAH	
13	(a)	$\frac{x}{1.6} \times 100 = 125$ x = RM2.00	K1 N1	2
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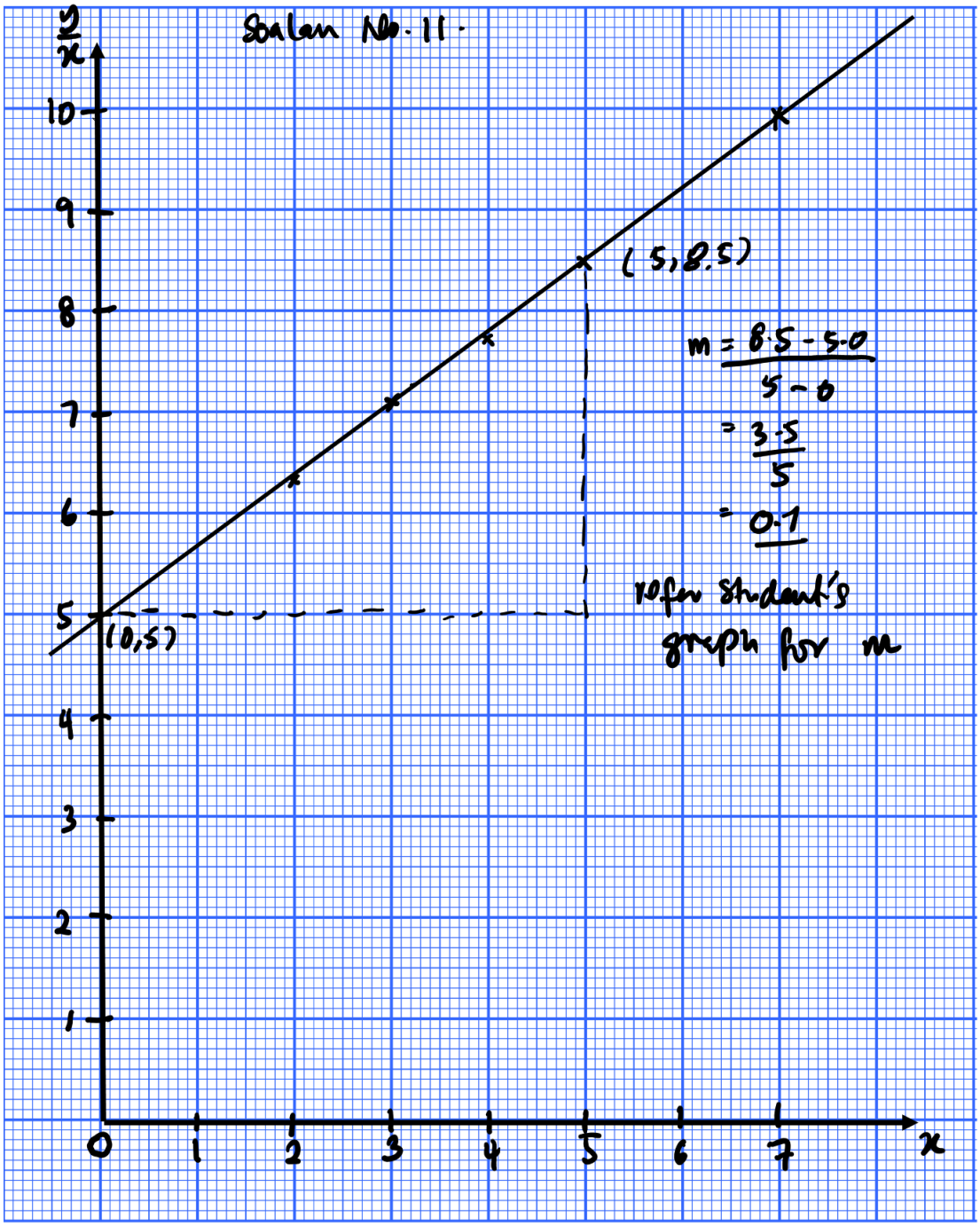
				10 M

NO		JAWAPAN	MARKAH	
14	(a)	$\angle DAE = \angle BAC$ $\angle BAC = \sin^{-1}\frac{12}{13}$ $= \frac{67.38°}{180°} \times 3.142$ = 1.176 rad	K1 K1 N1	3
	(b)	$BC^2 = 0.2^2 + 0.3^2 - 2(0.2)(0.3)$ kos 67.38° = 0.194 km	K1 N1	2
	(c)	$\Delta ADE = \frac{1}{2}(0.13)(0.06)\sin 67.38°$ $= \frac{9}{2500}$ km^2 / 3.6×10^{-3} km^2	K1 N1	

		$\frac{\sin C}{0.2} = \frac{\sin 67.38°}{0.194}$ $\angle BCA = 72.106°$ $\frac{9}{2500} = \frac{1}{2} \times GC \times 0.09 \times \sin 72.106°$ $GC = 0.084$ km $EG = 0.24 - 0.084$ $= 0.156$ km	K1 K1 N1	
				10 M
15	(a)	$2x + y \leq 24$ $x + 2y \leq 18$ $y \leq 2x$	N1 N1 N1	3
	(b)	Rujuk lampiran graf 3 Garis dan kawasan berlorek betul	K1 N1 N1	3
	(c)	Bilangan – 4 $(10,4)$ $20(10) + 16(4) = k$ $RM\ 264$	N1 N1 K1 N1	4


Soalan No. 11.
y/x
10
9
8
7
6
5
4
3
2
1
0
1
2
3
4
5
6
7
x
(0,5)
(5,8.5)
m = 8.5 - 5.0 / 5 - 0
= 3.5 / 5
= 0.1
rofer student's graph for m

Soalan No 15 (b)