KEMENTERIAN PENDIDIKAN MALAYSIA

i-MODUL KECEMERLANGAN SPM SMKA DAN SABK 2021

SIJIL PELAJARAN MALAYSIA 2021 (SET 2)

MATEMATIK TAMBAHAN

Kertas 1

PERATURAN PEMARKAHAN

UNTUK KEGUNAAN PEMERIKSA SAHAJA

AMARAN

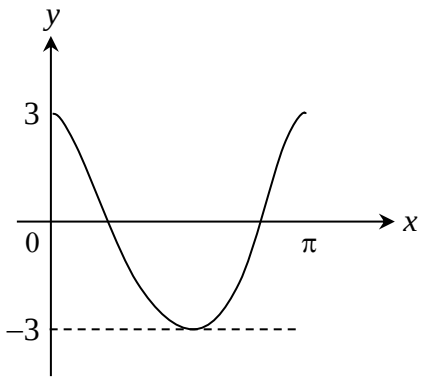
Peraturan pemarkahan ini SULIT dan **Hak Cipta Majlis Pengetua SMKA** dan **Majlis Pengetua SABK**. Kegunaan khusus untuk guru-guru tingkatan 5 di SMKA dan SABK sahaja. Peraturan ini tidak boleh dikeluarkan dalam apa jua bentuk media cetak.

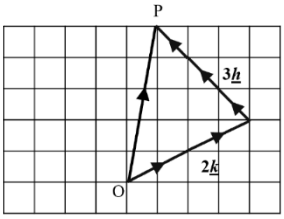
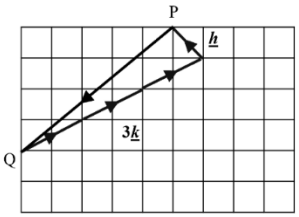
CADANGAN PERATURAN PEMARKAHAN (SKEMA)
Kertas 1

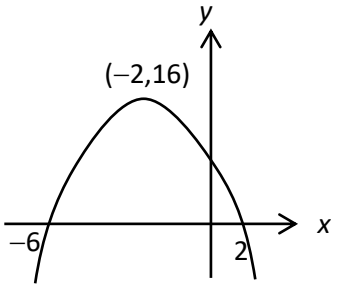
Soalan	Butiran	Markah
1 (a)(i)	3	1
1 (a)(ii)	{(0,0),(1,1),(4,2),(9,3),(16,4)}	1
1 (b)(i)	$h = -\frac{3}{2}$	1
1 (b)(ii)	$\frac{2+k}{2(2)+3} = 2$	1
	$k = 12$	1
		5 m
2 (a)	$\text{HTP} = \text{m} + \text{n} = -\frac{5}{2}$	1
	$\text{HDP} = \text{mn} = \frac{9}{2}$	
	$\text{HTP} = \text{m} + 2 + \text{n} + 2 = \frac{3}{2}$	1
	$-\frac{-3}{p} = \frac{3}{2}$	
	$p = 2$	1
	$\text{HDP} = (\text{m}+2)(\text{n}+2) = \text{mn} + 2(\text{m}+\text{n}) + 4 = \frac{7}{2}$	
	$\frac{q}{2} = \frac{7}{2}$	
	$q = 7$	1
2 (b)	$2x^2 + \sqrt{p}x - q + 1 = 0$	
	$\sqrt{p}^2 - 4(2)(-q+1) = 0$	1
	$p + 8q - 8 = 0$	
	$p = 8 - 8q$	1
		6 m
3 (a)	$S_1 = a = 3(1)^2 - 13(1)$	
	$= -10$	1
3 (b)	$S_2 = 3(2)^2 - 13(2) = -14$	
	$T_2 = S_2 - S_1$	
	$= -4$	1
	$d = -4 - (-10)$	
	$= 6$	1
3 (c)	$S_{16} = \frac{16}{2}[2(-10) + (16-1)6]$	1
	$= 560$	1
		5 m

4 (a)	$s = j\theta$	
	$1.5x = x\theta$	1
	$\theta = 1.5\text{rad}$	1
4 (b)	$s = j\theta$	
	$= 9(2\pi)$	
	$= 18\pi$	1
	$AB = 18\pi - 12 - 12 = 32.556$	1
	$32.556 = 12\theta$	
	$\theta = 2.713$	1
		5 m
5 (a)	Kecerunan QR = $-\frac{1}{2}$	1
	Persamaan garis QR : $y - 0 = -\frac{1}{2}(x - 10)$	1
	$y = -\frac{1}{2}x + 5$	1
5 (b)	$2x + 7 = -\frac{1}{2}x + 5$	1
	$x = -\frac{4}{5}, y = \frac{27}{5}$	
	$Q(-\frac{4}{5}, \frac{27}{5})$	1
		5 m
6 (a)	$2P_2 \times 2 \times 3P_1 \times 4P_1 = 2 \times 2 \times 3 \times 4$	1
	= 48	1
6 (b)(i)	$9C_9 \times 7C_3$	1
	= 35	1
6 (b)(ii)	$(7C_6 \times 9C_6) + (7C_7 \times 9C_5)$	1
	= 588 + 1265	
	= 714	1
		6 m
7 (a)	k = 1- ($\frac{16}{81} + \frac{16}{81} + \frac{7}{27} + \frac{1}{81}$) = $\frac{1}{3}$	1
	$P(X=4) = {}^4C_4 p^4 q^0 = \frac{1}{81}$	1
	$p^4 = \frac{1}{81}$	
	$p^4 = \left(\frac{1}{3}\right)^4$	
	$p = \frac{1}{3}$	1
7 (b)(i)	z = $\frac{X-\mu}{\sigma}$	
	1.11 = $\frac{X-12.45}{5}$	
	X = 18	1
7 (b)(ii)	P(–k < z < k) = 0.7154	1
	P(z > k) = $\frac{1-0.7154}{2}$ = 0.1423	
	k = 1.07	1
		6 m

8 (a)	$\frac{y}{10}=8$	1
	$y=80$	1
8 (b)	$\left(y=3x^2-\frac{p}{x}\right)\times x$	1
	$xy=3x^3-p$	
	Pintasan-y = -p = 3	
	$p=-3$	1
	kecerunan = $3=\frac{8-3}{q-0}$	
	$q=\frac{5}{3}$	1
		5 m
9 (a)	$\frac{dy}{du}=\frac{1}{4}u^2$, $\frac{du}{dx}=-3$	
	$\frac{dy}{dx}=\frac{dy}{du}\times\frac{du}{dx}$	
	$=\frac{1}{4}u^2\times-3$	1
	$=-\frac{3}{4}(2-3x)^2$	1
9 (b)	$\frac{dy}{dx}=-\frac{3}{4}(2-3(0))^2=-3$	1
	kecerunan garis normal, $m=\frac{1}{3}$	1
	persamaan garis normal,	
	$y-2=\frac{1}{3}(x-0)$	
	$y=\frac{1}{3}x+2$	1
		5 m
10 (a)(i)	$3(-\int_4^6 n(x)dx)=3(-13)$	
	$=-39$	1
10 (a)(ii)	$\int_4^5 n(x)dx+\int_5^6 n(x)dx-\int_5^6 2\,dx$	
	$\int_4^6 n(x)dx-[2x]_5^6$	1
	$13-[2(6)-2(5)]$	
	11	1
10 (b)	$[4x^2-5x]_5^m$	1
	$(4m^2-5m)-[4(5^2)-5(5)]$	1
	$4m^2-5m-75$	
		5 m

11	$2x+3y+4z=11$ …(3) $4x+3y+z=10$ …(2) $x+2y+4z=8$ …(1) $x=8-2y-4z$ …(1) Gantikan (1) dalam (2) $4(8-2y-4z)+3y+z=10$ $32-8y-16z+3y+z=10$ $5y+15z=22$ …(4) Gantikan (1) dalam (3) $2(8-2y-4z)+3y+4z=11$ $16-4y-8z+3y+4z=11$ $y+4z=5$ $y=5-4z$ …(5) Gantikan (5) dalam (4) $5(5-4z)+15z=22$ $25-20z+15z=22$ $z=0.6$ $y=5-4(0.6)=2.6$ $x=8-2(2.6)-4(0.6)=0.4$ Harga sebatang pembaris ialah RM0.40, sebatang pen marker ialah RM2.60 dan sebatang pen ialah RM0.60.	 1 1 1 1+1+1
		6 m
12	 kos $2x = 2k$ $3 \text{ kos } 2x = 6k$ $y = 6k$ mempunyai satu penyelesaian di $y=-3$ $6k = -3$ $k = -\frac{1}{2}$	 1 1 1 1 1
		5 m

13 (a)	$2p\underset{\sim}{x}+3\underset{\sim}{y}$	
	$2p(2\underset{\sim}{i}-\underset{\sim}{j})+3(-\underset{\sim}{i}+3\underset{\sim}{j})$	1
	$4p\underset{\sim}{i}-2p\underset{\sim}{j}-3\underset{\sim}{i}+9\underset{\sim}{j}$	
	$(4p-3)\underset{\sim}{i}+(-2p+9)\underset{\sim}{j}$	
	Selari dengan paksi $x \to y = 0$	1
	$-2p + 9 = 0$	
	$p = \frac{9}{2}$	1
13 (b)(i)	$\overrightarrow{OA} = \begin{pmatrix} -1 \\ 2 \end{pmatrix}$ $\overrightarrow{OB} = \begin{pmatrix} 4 \\ 3 \end{pmatrix}$	
	$\overrightarrow{AB} = \overrightarrow{AO} + \overrightarrow{OB}$	
	$= \begin{pmatrix} 1 \\ -2 \end{pmatrix} + \begin{pmatrix} 4 \\ 3 \end{pmatrix}$	1
	$= \begin{pmatrix} 5 \\ 1 \end{pmatrix}$	1
13 (b)(ii)	$\left\|\overrightarrow{AB}\right\| = \sqrt{5^2+1^2} = \sqrt{26}$	
	$\overrightarrow{AB} = \frac{1}{\sqrt{26}}\begin{pmatrix} 5 \\ 1 \end{pmatrix}$	1
13 (c)(i)	$\overrightarrow{OP} = 2\underset{\sim}{k} + 3\underset{\sim}{h}$	1
13 (c)(ii)	$\overrightarrow{PQ} = -3\underset{\sim}{k} - \underset{\sim}{h}$	1
	 	
		8 m

14 (a)	$f(x) = -x^2 - 4x + 12$	
	$= -(x^2 + 4x + \left(\frac{4}{2}\right)^2 - \left(\frac{4}{2}\right)^2 - 12)$	1
	$= -(x+2)^2 + 16$	1
	$f(x) = -x^2 - 4x + 12$ $= -(x-2)(x+6)$	1
		1 1 1
14 (b)	$4x + m = -x^2 - 4x + 12$	
	$x^2 + 8x + m - 12 = 0$	
	$8^2 - 4(1)(m-12) < 0$ $64 - 4m + 48 < 0$ $4m > -112$	1
	$m > -28$	1
		8 m
15 (a)	$\left(p^a\right)^{b+c} \div \left(p^b\right)^{a-c} \div \left(p^c\right)^{a+b}$	
	$= p^{ab+ac-(ab-bc)-(ac+bc)}$	1
	$= 1$	1
15 (b)(i)	$x - 7\sqrt{x} + 12 = 0$	1
	$(\sqrt{x} - 4)(\sqrt{x} - 3) = 0$	1
	$\sqrt{x} = 4$ atau $\sqrt{x} = 3$ $x = 16$ $\quad$ $x = 9$	1
15 (b)(ii)	$\log_4 x + \log_{16} 3x = -1$	
	$\log_4 x + \frac{\log_4 3x}{\log_4 16} = -1$	1
	$\log_4 x + \frac{\log_4 3x}{2} = -1$	
	$2\log_4 x + \log_4 (3x) = -2$	
	$\log_4 x^2 (3x) = -2$	
	$3x^3 = 4^{-2}$	1
	$x = 0.2752$	1
		8 m