i-MODUL KECEMERLANGAN SPM SMKA DAN SABK 2021

SIJIL PELAJARAN MALAYSIA 2021 (SET 3)

MATEMATIK TAMBAHAN

Kertas 1

PERATURAN PEMARKAHAN
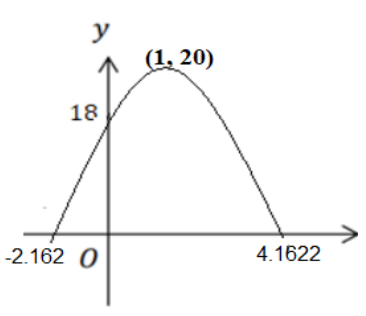
UNTUK KEGUNAAN PEMERIKSA SAHAJA

Peraturan pemarkahan ini mengandungi 8 halaman bercetak
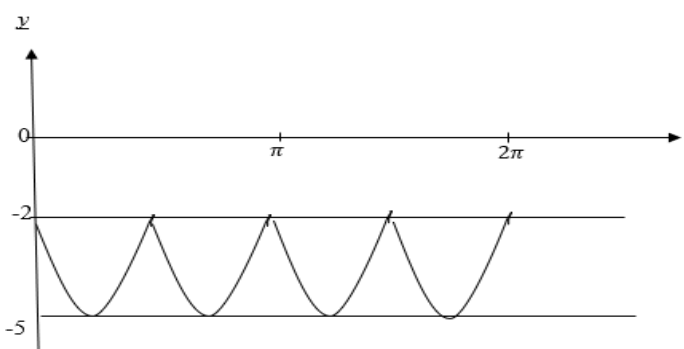
CADANGAN PERATURAN PEMARKAHAN (SKEMA)
Kertas 1 Set 3

Soalan	Butiran	Markah
1 (a)	$a = 6$	1
1 (b)	$s(12) = \frac{2}{3}$	1
1 (c)	$rs(k) = -12$ $r\left(\frac{4}{k-6}\right) = -12$	1
	$6\left(\frac{4}{k-6}\right) = -12$	
	$\left(\frac{4}{k-6}\right) = -2$	1
	$k = 4$	1
		5 m
2 (a)(i)	$6! = 720$	1
2 (a)(ii)	$^2P_2 \times {}^4P_4 \times 5 = 240$	1+1
2 (b)(i)	$^{15}C_6 = 5005$	1+1
2 (b)(ii)	$^6C_2 \times {}^5C_2 \times {}^4C_2$ $15 \times 10 \times 6$	1
	900	1
		7 m
3 (a)(i)	$(3^{2x-3}) = 3^0$ $2x - 3 = 0$ $x = \frac{3}{2}$	1
3 (a)(ii)	$3^{3x} - 3^{3x}.3^{-1} = 54$	
	$3^{3x}\left(1 - \frac{1}{3}\right) = 54$	1
	$3^{3x} = 3^4$	
	$x = \frac{4}{3}$	1

3 (b)	$\frac{1}{2} \times (2 + \sqrt{3})(5 - \sqrt{3})$	1
	$\frac{1}{2} \times (4 + \sqrt{3})$	
	$2 + \frac{\sqrt{3}}{2} = q + \frac{\sqrt{3}}{2}$	
	$q = 2$	1
		7 m
4	$\log_3(2x + 3) - 4\frac{\log_3 x^2}{\log_3 9} + 3\log_3 x = 2$	1
	$\log_3(2x + 3) - \log_3 x^4 + \log_3 x^3 = 2$	
	$\log_3 \frac{(2x + 3).x^3}{x^4} = 2$	1
	$\frac{(2x+3)}{x} = 3^2$	1
	$x = \frac{3}{7}$	1
		4 m
5	*Tahun ke berapa Salim dan Sally mula menyimpan:*	
	Skim A (Salim) $2000 + (n - 1)200 \geq 3000$ $200n \geq 1200$ $n = 6$ (tahun ke-6)	1
	Skim B (Sally) $2000(1.05)^{n-1} \geq 3000$ $(n - 1)log\ 1.05 \geq log 1.5$ $n \geq 9.311$ $n = 10$ (tahun ke-10)	1
		1
	Simpanan selama 20 tahun pertama bekerja *Skim A* $S_{20} - S_5$ $= [\frac{20}{2}(2(2000) + (19)200 - \frac{5}{2}(2(2000) + (4)(200)] \times 0.15 \times 12$ $= RM\ 118\ 800$	1 1
	Skim B $S_{20} - S_9$ $= (\frac{2000(1.05^{20}-1)}{1.05-1} - \frac{2000(1.05^9-1)}{1.05-1}) \times 0.15 \times 12$ $= RM\ 79\ 341.80$ *Salim mempunyai jumlah simpanan lebih banyak*	1 1
		7 m

6	$xy = 4x^3 - b$	1
	$\dfrac{12 - 4}{a - 0} = 4$	
	$a = 2$	1
	$b = 4$	1
		3 m
7	$m = -2n$	1
	$(-2n)^2 + n(-2n - 6) - 6 = 0$	1
	$2n^2 - 6n - 6 = 0$	
	$n = \dfrac{-(-6) \pm \sqrt{(-6)^2 - 4(2)(-6)}}{2(2)}$	1
	$n = \quad 3.791 \quad m = -7.582$	1
	$n = -0.791 \quad m = 1.582$	1
		5 m
8 (a)	$p = 1$	1
	$q = 20$	1
8 (b)	$x = 1$	1
8 (c)	Bentuk	1
	Titik maksimum (1,20)	1
	Pintasan-y	1
	Pintasan-x	1
		7 m

9 (a)(i)	P(x = 3) = $^6C_3$ $(0.25)^3$ $(0.75)^3$ = 0.1318	1+1
9 (a)(ii)	$1 - P(x = 0)$ $1 - ^6C_0$ $(0.25)^0$ $(0.75)^6$ 0.8220	 1 1
9 (b)	$P(-k \leq z \leq k) = 0.6184$ $\frac{1-0.6184}{2} = 0.1908$ $\frac{k-43}{8} = 0.875$ $k = 50$	1 1 1
		7 m
10 (a)	$24 = \frac{1}{2}(25k^2)(\frac{1}{3}) - \frac{1}{2}(9k^2)(\frac{1}{3})$ $144 = 16k^2$ $k = 3$	1 1
10 (b)	$9(\frac{1}{3}) + 15(\frac{1}{3}) + 12$ 20	 1 1
		4 m
11	$y + \delta y = 2(x + \delta x)^2 + 4(x + \delta x) + 3$ $\delta y = 2\,[x^2 + 2x\,\delta x + (\delta x)^2] + 4x + 4\delta x + 3 - (2x^2 + 4x + 3)$ $\quad = 2x^2 + 4x\delta x + 2(\delta x)^2 + 4x + 4\delta x + 3 - (2x^2 + 4x + 3)$ $\quad = 4x\delta x + 2(\delta x)^2 + 4\delta x$ $\frac{\delta y}{\delta x} = 4x + 2\delta x + 4$ $\frac{dy}{dx} = \frac{had}{\delta x \to 0} 4x + 2\delta x + 4$ $\frac{dy}{dx} = 4x + 2(0) + 4$ $\frac{dy}{dx} = 4x + 4$	1 1 1 1
		4

12 (a)	Bentuk, amplitud, kala	1+1+1
12 (b)	$2\text{kos } x \sin x = \dfrac{\sqrt{3}}{3}$	
	$\sin 2x = \dfrac{\sqrt{3}}{3}$	1
	$2x = 35.26^0, 144.74^0, 395.26^0, 504.74^0$	1
	$x = 17.63^0, 72.37^0, 197.63^0, 252.37^0$	1
		6 m
		64 m
13 (a)(i)	$(5,0) = (\dfrac{3(3) + 2x}{5}, \dfrac{4(3) + 2y}{5})$	
	$5 = \dfrac{9+2x}{5} \quad , \quad 0 = \dfrac{12+2y}{5}$	1+1
	$x = 8 \quad , \quad y = -6$	
	$Q(8, -6)$	1
13 (a)(ii)	$\dfrac{1}{2}\begin{vmatrix} -4 & 3 & 8 & -4 \\ -3 & 4 & -6 & -3 \end{vmatrix}$	
	$\dfrac{1}{2}\|[-4(4) + 3(-6) + 8(-3)] - [-3(3) + 4(8) + (-6)(-4)]\|$	1
	$\dfrac{1}{2}\|-105\|$	
	$52.5 \; cm^2$	1
13 (b)	$ZP = 2QZ$	
	$\sqrt{(x - (-4))^2 + (y - (-3)^2} = 2\sqrt{(x-8)^2 + (y - (-6)^2}$	1+1
	$(x + 4)^2 + (y + 3)^2 = 4[(x - 8)^2 + (y + 6)^2]$	
	$x^2 + y^2 + 8x + 6y + 25 = 4(x^2 + y^2 - 16x + 12y + 100)$	
	$3x^2 + 3y^2 - 72x + 42y + 375 = 0$	
	$x^2 + y^2 - 24x + 14y + 125 = 0$	1
		8 m

14 (a)	$\frac{dy}{dx} = 4x - 10$	
	$y = \int 4x - 10\, dx$	
	$y = 2x^2 - 10x + c$	1
	$4 = 2(8)^2 - 10(8) + c$	1
	$c = -44$	
	$y = 2x^2 - 10x - 44$	1
14 (b)	Titik persilangan $4^2 = 8x$	
	$\qquad\qquad\qquad x = 2$	1
	Luas kawasan berlorek	
	$\int_2^{10} (8x)^{\frac{1}{2}}\, dx - 8 \times 4$	1
	$= \left[\frac{2(8x)^{\frac{3}{2}}}{3(8)} \right]_2^{10} - 32$	1
	$= \left(\frac{2(8(10))^{\frac{3}{2}}}{3(10)} \right) - \left(\frac{2(8(2))^{\frac{3}{2}}}{3(2)} \right) - 32$	1
	$= 22.30$	1
		8 m
15 (a)(i)	$\overrightarrow{ON} = \overrightarrow{OM} + \overrightarrow{MN}\quad atau$	
	$\quad = 6\underline{i} + 5\underline{j} - (4\underline{i} + \underline{j})$	
	$\quad = 2\underline{i} + 4\underline{j}$	1
15 (a)(ii)	$|\overrightarrow{ON}| = \sqrt{2^2 + 4^2}$	1
	$\quad = \sqrt{20}$	
	$vektor\ unit\ \overrightarrow{ON} = \frac{1}{\sqrt{20}}(2\underline{i} + 4\underline{j})$	1
15 (b)(i)	$\overrightarrow{LN} = \overrightarrow{LO} + \overrightarrow{ON}$	
	$\quad = -(4\underline{i} + \underline{j}) + 2\underline{i} + 4\underline{j}$	
	$\quad = -2\underline{i} + 3\underline{j}$	1
	$\overrightarrow{NP} = \overrightarrow{NO} + \overrightarrow{OP}$	
	$\quad = -(2\underline{i} + 4\underline{j}) + (-8\underline{i}) + 19\underline{j}$	
	$\quad = -10\underline{i} + 15\underline{j}$	1

15 (b)(ii)	$\overrightarrow{LN} = \lambda\overrightarrow{NP}$ *atau setara* $-2\underline{i} + 3\underline{j} = \lambda(-10\underline{i} + 15\underline{j})$ $-2 = -10\lambda$ $\lambda = \dfrac{1}{5}$ $\overrightarrow{LN} = \dfrac{1}{5}\,\overrightarrow{NP}$ *atau setara*	1 1 1
		8
		16 m