

SULIT
3472/1
Additional Mathematics
2021



MAJLIS PENGETUA SEKOLAH MENENGAH MALAYSIA
CAWANGAN NEGERI SEMBILAN DARUL KHUSUS

**PROGRAM PENINGKATAN AKADEMIK TINGKATAN 5
SEKOLAH-SEKOLAH MENENGAH NEGERI SEMBILAN 2021**

**PERATURAN PERMARKAHAN
ADDITIONAL MATHEMATICS PAPER 1**

MARKING SCHEME FOR PAPER 1

NO	SCHEME	MARKS
1(a)	$3(3) - 1$	K1
	salah, $p = 8$	N1
(b)	$y = 3x - 1$ and $x = \frac{y + 1}{3}$	P1
	$h^{-1} = \frac{3+6\left(\frac{y+1}{3}\right)}{3\left(\frac{y+1}{3}\right)-2}$	K1
	$h^{-1} = \frac{5+2x}{x-1}, x \neq 1$	N1
		5 marks
2(a)	$\frac{\pi}{3}$	N1
(b)	Length $AB = \frac{\sqrt{3}}{2}x$	K1
	Area $\triangle ABC = \frac{1}{2}x\left(\frac{\sqrt{3}}{2}x\right)$ or $\frac{1}{2}x^2 \sin 60^\circ$ or Area of sector ABC = $\frac{1}{2}\left(\frac{\sqrt{3}}{2}x\right)^2\left(\frac{\pi}{3}\right)$	K1
	$\frac{1}{2}x\left(\frac{\sqrt{3}}{2}x\right) - \frac{1}{2}\left(\frac{\sqrt{3}}{2}x\right)^2\left(\frac{\pi}{3}\right)$	K1
	$\frac{\sqrt{3}}{4}x^2 - \frac{\pi x^2}{8}$ or equivalent	N1
		5 marks
3(a)	$\alpha - 5 + \alpha = -(p - 1)$ or $(\alpha - 5)\alpha = 2p$ or equivalent	K1
	$(\alpha - 5)\alpha = 2(6 - 2\alpha)$ or equivalent	K1
	$\alpha = 4$ or $p = 6 - 2\alpha$	K1
	$x = -1, x = 4$	N1
(b)	$p = -2$	N1
		5 marks
4(a)	$S_{20} - S_5 = \frac{20}{2}[2(4.5) + 19(3.5)] - \frac{5}{2}[2(4.5) + 4(3.5)]$	K1
	$697\frac{1}{2}$	N1
(b)	$230 + (n - 1)(-4) < 40$	K1
	$n = 49$	K1
	38	N1
		5 marks

5(a)	$\frac{2(2\sqrt{x} + 1) - 1(2\sqrt{x} - 1)}{(2\sqrt{x} - 1)(2\sqrt{x} + 1)}$	K1
	$\frac{2\sqrt{x} + 3}{4x - 1}$	N1
(b)	$p - q - 2\sqrt{p - q}\sqrt{p + q} + p + q = 1$	K1
	$4(p - q)(p + q) = (1 - 2p)^2$ or $4(p - q)(p + q) = (2p - 1)^2$	K1
	$q = \frac{\sqrt{4p - 1}}{2}$	N1
		5 marks
6(a)	$\lim_{x \rightarrow 3} \frac{(x - 3)(3 + \sqrt{12 - x})}{(3 - \sqrt{12 - x})(3 + \sqrt{12 - x})}$	K1
	$3 + \sqrt{12 - 3}$	K1
	6	N1
(b)	$\frac{dy}{dx} = 2x - 2$ or $m_T = -\frac{1}{k}$	K1
	$2x - 2 = -\frac{1}{k}$	K1
	$P(1 - \frac{1}{2k}, k - \frac{1}{2})$	N1
		6 marks
7(a)	-18	P1
(b)	$y = \frac{kx^3}{3} - x^2 + c$	K1
	$c = 7 - \frac{k}{3}$ or $c = \frac{8}{3}k - 11$	K1
	$7 - \frac{k}{3} = \frac{8}{3}k - 11$	K1
	$k = 6$	K1
	$y = 2x^3 - x^2 + 5$	N1
		6 marks
8(a)	$1 - 2\sin^2 \frac{3A}{2}$	K1
	$1 - 2p^2$	N1
(b)	$\frac{\cot^2 \theta + 1}{\cot \theta}$ or $\tan \theta + \frac{1}{\tan \theta}$ or $\frac{\cos \theta}{\sin \theta} + \frac{\sin \theta}{\cos \theta}$	K1
	$\frac{\operatorname{cosec}^2 \theta}{\cot \theta}$ or $\frac{\sec^2 \theta}{\tan \theta}$ or $\frac{\cos^2 \theta + \sin \theta}{\sin \theta \cos \theta}$	K1
	$\frac{2}{\sin 2\theta}$	N1
		5 marks

9(a)	i) $\log_3 y = \log_3 h + (x - 2) \log_3 k$	N1										
	ii) $x - 2$	N1										
(b)	i) $m < 0$	N1										
	ii) $h = \frac{1}{27}$	N1										
	$p - 3 = -3 + (3 - 2) \log_3 k$	K1										
	$k = 3^p$	N1										
		6 marks										
10(a)	$3(k^2 \underline{i} + 2 \underline{j}) + 2(k \underline{i} + 3 \underline{j}) = \underline{i} + 12 \underline{j}$	K1										
	$3k^2 + 2k - 1 = 0$	K1										
	$k = \frac{1}{3}$ and $k = -1$	N1										
(b)	$\sqrt{6^2 + 12^2}$	K1										
	$6\sqrt{5} \text{ kmj}^{-1}$ or 13.42 kmj^{-1}	N1										
	296.57°	N1										
		6 marks										
11(a)	$\frac{3!}{2!} \times \frac{6!}{2! \times 2!}$	K1										
	540	N1										
(b)	$\frac{(n+2)(n+1)(n)(n-1)!}{(n-1)!} = 30n$	K1										
	$(n+2)(n+1) = 30$	K1										
	$n = 4$	N1										
		5 marks										
12(a)	$X = \{0, 1, 2, 3\}$	N1										
(b)	$P(X=0) = {}^3C_0 \times \left(\frac{1}{3}\right)^0 \times \left(\frac{2}{3}\right)^3$ or equivalent OR correct Tree Diagram	K1										
	<table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>$X=r$</th> <th>0</th> <th>1</th> <th>2</th> <th>3</th> </tr> </thead> <tbody> <tr> <td>$P(X=r)$</td> <td>0.2963 or $\frac{8}{27}$</td> <td>0.4444 or $\frac{4}{9}$</td> <td>0.2222 or $\frac{2}{9}$</td> <td>0.0370 or $\frac{1}{27}$</td> </tr> </tbody> </table>	$X=r$	0	1	2	3	$P(X=r)$	0.2963 or $\frac{8}{27}$	0.4444 or $\frac{4}{9}$	0.2222 or $\frac{2}{9}$	0.0370 or $\frac{1}{27}$	K1
$X=r$	0	1	2	3								
$P(X=r)$	0.2963 or $\frac{8}{27}$	0.4444 or $\frac{4}{9}$	0.2222 or $\frac{2}{9}$	0.0370 or $\frac{1}{27}$								

(c)		N2 (Paksi-1 Graf -1)
(d)	$\frac{7}{27}$ or 0.2593 / 0.2592	N1
		6 marks
13(a)	Seen using gradient or area or vector or equivalent method and substitute the correct value of (x, y)	K1
	P, Q and S	N1
(b)	$y = \frac{3}{2}x$	P1
(c)	Seen $m = -\frac{2}{3}$	K1
	T and R	N1
(d)	$\sqrt{(1)^2 + (-5)^2}$	K1
	$\sqrt{(x-0)^2 + (y-0)^2} = \sqrt{26}$	K1
	$x^2 + y^2 - 26 = 0$	N1
		8 marks
14	$4x + 2y + 3z = 680, 2x + 3y + 2z = 620, x + 4y + 2z = 690$	
	(at least 1 correct- P1, all correct-P2)	P2
	$x = 690 - 4y - 2z$ or $x = 310 - \frac{3}{2}y - z$ or equivalent	K1 (for x)
	$690 - 4y - 2z = 310 - \frac{3}{2}y - z$	
	$z = 380 - \frac{5}{2}y$ or equivalent	K1 (for z)
	$4[310 - \frac{3}{2}y - (380 - \frac{5}{2}y)] + 2y + 3(380 - \frac{5}{2}y) = 680$ or equivalent	K1 (to find y)
	Senior citizen = RM50,	N1
	Adult = RM120,	N1
	A child = RM80.	N1
		8 marks

15(a)	Seen $gf(x)$	P1
	$gf(x) = 0.025(x - 100\ 000)$	P1
(b)	$0.025(225\ 000 - 100\ 000)$ or replace $x=225\ 000$ in the composite function from (a)	K1
	$2000 + 0.025(225\ 000 - 100\ 000)$	K1
	RM5125	N1
(c)	$2000 + 0.025(x - 100\ 000) \geq 8000$	K1
	$x \geq 340\ 000$	K1
	Minimum sales = RM340 000	N1
		8 marks