



**PENTAKSIRAN DIAGNOSTIK AKADEMIK
SEKOLAH BERASRAMA PENUH 2021**

**PEPERIKSAAN PERCUBAAN SIJIL PELAJARAN MALAYSIA
MATEMATIK TAMBAHAN**

3472/1

**Kertas 1
November 2021**

PERATURAN PEMARKAHAN

**MATEMATIK TAMBAHAN
KERTAS 1**

UNTUK KEGUNAAN PEMERIKSA SAHAJA

AMARAN

Peraturan pemarkahan ini **SULIT** dan **Hak Cipta Sekolah Berasrama Penuh**. Kegunaannya khusus untuk pemeriksa yang berkenaan sahaja. Sebarang maklumat dalam peraturan pemarkahan ini tidak boleh dimaklumkan kepada sesiapa. Peraturan pemarkahan ini tidak boleh dikeluarkan dalam apa-apa jua bentuk penulisan dan percetakan.

NAMA PEMERIKSA	:	
NAMA SEKOLAH	:	
TANDA TANGAN PENERIMAAN PERATURAN PERMARKAHAN	:	
TARIKH	:	
COP SEKOLAH	:	

Peraturan Pemarkahan ini mengandungi 7 halaman bercetak.

Number	Solution and Marking Scheme	Sub Marks	Full Marks
1(a)	$\alpha + \beta = \frac{5}{3}$ $\alpha\beta = \frac{-7}{3}$	N1	
1(b)	$2\alpha + 2\beta = \frac{10}{3} \quad \text{or} \quad (2\alpha)(2\beta) = -\frac{28}{3}$ $3x^2 - 10x - 28 = 0$	K1 N1	4
2(a)	$f^{-1}(x) = 4x + 12$	N1	
2(b)	$g(x) = \frac{4x+12}{2} - 7$ $g(x) = 2x - 1$	K1 N1	
2(c)	$f^{-1}(2) = 20 \quad \text{OR} \quad gf^{-1}(x) = 8x + 23$ 39	K1 N1	5
3.	$y\sqrt{x} = px - 5 \quad \text{or} \quad \frac{y}{\sqrt{x}} = p - \frac{5}{x}$ $m - 3 = -5 \quad \text{or} \quad 1 - m = p$ $m = -2$ $p = 3$	K1 K1 N1 N1	4

Number	Solution and Marking Scheme	Sub Marks	Full Marks
4. (a) (b)	$\cos \beta = -\frac{1}{\sqrt{1+q^2}} \quad \text{or} \quad \tan \alpha = \frac{p}{\sqrt{1-p^2}}$ $\left(-\frac{q}{\sqrt{1+q^2}}\right)(0) + \left(-\frac{1}{\sqrt{1+q^2}}\right)(1)$ $-\frac{1}{\sqrt{1+q^2}}$ $\frac{2\left(\frac{p}{\sqrt{1-p^2}}\right)}{1-\left(\frac{p}{\sqrt{1-p^2}}\right)^2} \quad \text{or} \quad \frac{2(-p)(-\sqrt{1-p^2})}{1-2(-p)^2}$ $\frac{2p\sqrt{1-p^2}}{1-2p^2}$	K1 K1 N1 K1 N1	5
5(a)(i) (ii) (b)	720 ${}^3P_3 \times {}^3P_3 \times 4$ or ${}^3P_3 \times {}^4P_4$ or $3 \times 3 \times 4$ 144 $\frac{4!}{2!}$ $\frac{4!}{2!} \times \frac{4!}{2!} \times 2$ 288	N1 K1 N1 K1 K1 N1	6

Number	Solution and Marking Scheme	Sub Marks	Full Marks
6(a)	$x = 100$	P1	
(b)	$f(x) = a(x-100)^2 + 110$ $210 = a(0-100)^2 + 110$ $f(x) = \frac{1}{100}(x-100)^2 + 110$	N1 K1 N1	
(c)	$b^2 - 4ac = (-200)^2 - 4(1)(21000)$ $-44000 < 0$ and no real roots	K1 N1	6
7(a)	0	N1	
(b)(i)	$4 \left[\frac{x^2+1}{3x-2} \right]_0^k = 5$ $k = 2$	K1 N1	
(ii)	$\int_{-1}^4 g(x)dx + \int_{-1}^4 kdx = 37$ $[kx]_{-1}^4$ $k = 7$	K1 K1 N1	6
8(a)	$m_{AB} = -\frac{1}{\alpha}$ and $m_{CD} = \frac{1}{4-5\alpha}$ or $m_{BC} = 3$ and $m_{AD} = \frac{3}{\alpha}$ $\alpha = 1$	K1 N1	
(b)	$\frac{5(2)+4(x)}{4+2} = 1$ or $\frac{12(2)+4(y)}{4+2} = 0$ $E(-1, -6)$	K1 N1	4

Number	Solution and Marking Scheme	Sub Marks	Full Marks
9(a)	$\log_7 21 = 3y - 1$ OR $7^x = 3$ $\log_7 7 + \log_7 3 = 3y - 1$ OR $7^{3y-1} = 7^1 (7^x)$ $y = \frac{x+2}{3}$	K1 K1 N1	6
(b)	$25^{x+1} = (5^2)^{x+1}$ or $125 = 5^3$ $x^2 - 2x - 2 = 3$ $x = 1$	P1 K1 N1	
10(a)	$\angle BOC = \pi - 2\alpha$ $10\pi - 20\alpha$	P1 N1	6
(b)	$\theta = 1 \text{ rad}$ $\frac{1}{2} \times 10^2 \times 2.142$ $\frac{1}{2} \times 10^2 \times 2.142 - \frac{1}{2} \times 10 \times 10 \times \sin 122.71^\circ$ 65.03	N1 K1 K1 N1	
11(a)	$\overline{PR} = \overline{PQ} + \overline{QR}$ $\overline{PR} = 4\mathbf{u} + 18\mathbf{v}$	K1 N1	7
(b)(i)	$\overline{TX} = 4m\mathbf{u}$	N1	
(ii)	$\overline{PX} = \overline{PT} + \overline{TX}$ or $\overline{PX} = \lambda \overline{PR}$ or $\overline{PR} = \lambda \overline{PX}$ $4m\mathbf{u} + 9\mathbf{v} = \lambda(4\mathbf{u} + 18\mathbf{v})$ or $4\mathbf{u} + 18\mathbf{v} = \lambda(4m\mathbf{u} + 9\mathbf{v})$ $4m = 4\lambda$ or $18\lambda = 9$ 200 metres	P1 K1 K1 N1	

Number	Solution and Marking Scheme	Sub Marks	Full Marks
12	$P(\text{Red}) = \frac{9}{14} \text{ and } P(\text{Blue}) = \frac{5}{14}$ ${}^8C_0 \left(\frac{5}{14}\right)^0 \left(\frac{9}{14}\right)^8 \text{ or } {}^8C_1 \left(\frac{5}{14}\right)^1 \left(\frac{9}{14}\right)^7 \text{ or } {}^8C_2 \left(\frac{5}{14}\right)^2 \left(\frac{9}{14}\right)^6 \text{ or}$ ${}^8C_3 \left(\frac{5}{14}\right)^3 \left(\frac{9}{14}\right)^5 \text{ or } {}^8C_4 \left(\frac{9}{14}\right)^4 \left(\frac{5}{14}\right)^4$	P1	
(a)	0.1945	K1 N1	
(b)	$1 - {}^8C_0 \left(\frac{5}{14}\right)^0 \left(\frac{9}{14}\right)^8 - {}^8C_1 \left(\frac{5}{14}\right)^1 \left(\frac{9}{14}\right)^7 - {}^8C_2 \left(\frac{5}{14}\right)^2 \left(\frac{9}{14}\right)^6 - {}^8C_3 \left(\frac{5}{14}\right)^3 \left(\frac{9}{14}\right)^5$	K1	
	0.3090	N1	5
13(a)	$T_n = \frac{92}{3} \pi$ $a = \frac{50}{3} \pi \text{ and } d = \pi$ $\frac{50}{3} \pi + (n-1)(\pi) = \frac{92}{3} \pi$ $n = 15$	K1 K1 K1 N1	
(b)	$S_{25} = \frac{25}{2} \left[2 \left(\frac{50}{3} \pi \right) + 24\pi \right]$ $S_{25} = \frac{2150}{3} \pi$ $T_{25} = \frac{50}{3} \pi + (24)(\pi) = r \left(\frac{5}{3} \pi \right)$ $r = \frac{122}{5}$ $\frac{2150}{3} \pi + 2 \left(\frac{122}{5} - 10 \right)$	K1 K1 K1	
	2280.57 cm	N1	8

Number	Solution and Marking Scheme	Sub Marks	Full Marks
14(a)	$m_{normal} = -3$ $\frac{7 - (-2)}{p - 4} = -3$ $p = 1$	P1 K1 N1	
(b)	$\sqrt{(4-1)^2 + (-2-7)^2}$ or $\sqrt{(x-1)^2 + (y-7)^2}$ $\sqrt{(x-1)^2 + (y-7)^2} = \sqrt{90}$ $x^2 + y^2 - 2x - 14y - 40 = 0$	K1 K1 N1	
(c)	$\frac{1}{2} (0(-2) + 4(7) + 1(0)) - (0(4) + (-2)(1) + 0(7)) $ 15 units	K1 N1	8
15(a)	$P_1 = 125\left(\frac{0.8\pi}{r}\right)$ or $P_2 = 200(2\pi r^2)$ Total cost, $P = 400\pi r^2 + \frac{100\pi}{r}$ $800\pi r - \frac{100\pi}{r^2} = 0$ $r = 0.5$ metres $P = \text{RM } 942.60$	K1 K1 K1 N1 N1	
(b)	$\frac{dV}{dh} = 0.25\pi$ $0.005 = 0.25\pi \times \frac{dh}{dt}$ $\frac{dh}{dt} = 0.006365$ m/s	K1 K1 N1	8

PERATURAN PEMARKAHAN TAMAT