



## i-MODUL KECEMERLANGAN SPM SMKA DAN SABK 2024

# PEPERIKSAAN PERCUBAAN SPM 2024

### 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.

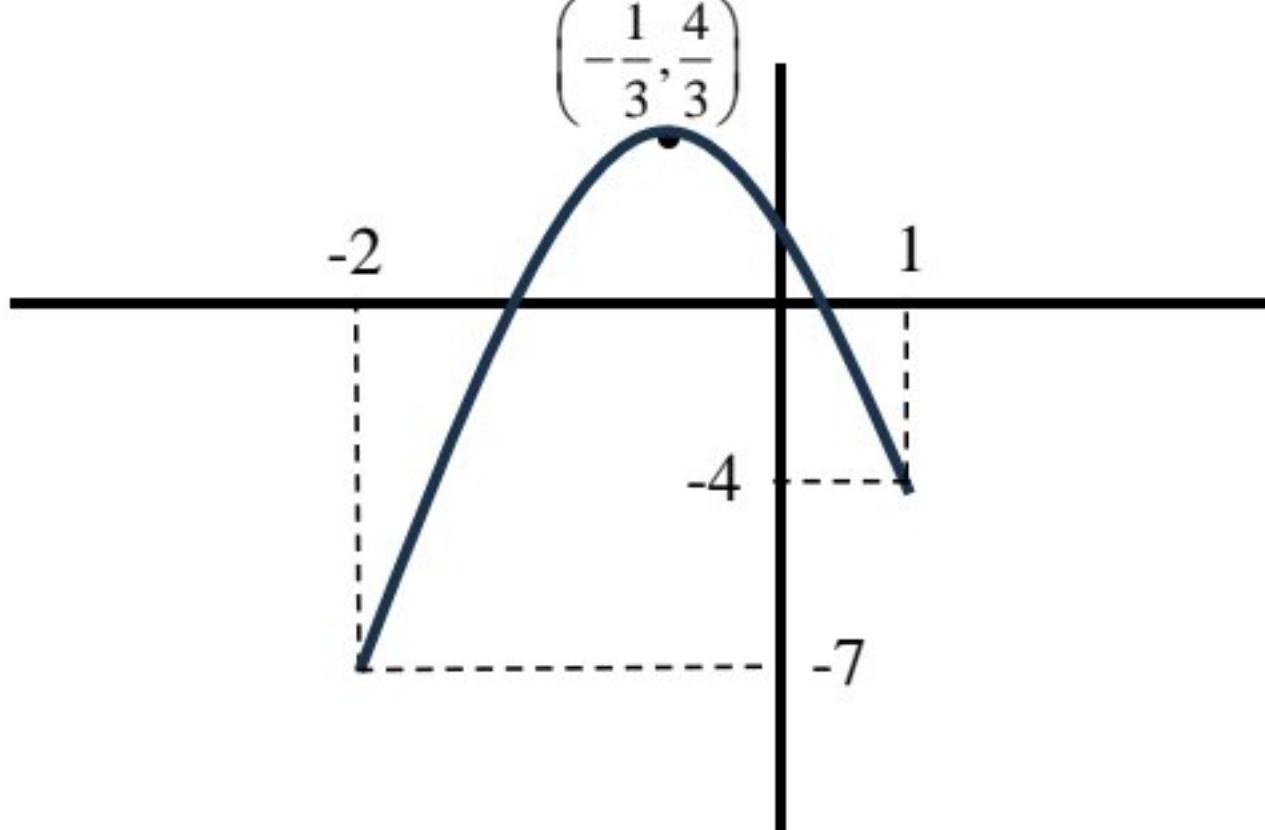
**CADANGAN PERATURAN PEMARKAHAN (SKEMA)**  
**Kertas 1**

<b>Soalan</b>		<b>Skema Pemarkahan</b>	<b>Markah</b>
<b>1</b>	(a)	$f^{-1}(x) = \frac{4x - 3}{2}$	P1
		$g(x) = 6\left(\frac{4x - 3}{2}\right) + 5$	K1
		$g(x) = 12x - 4$	N1
	(b)	$fg(x) = \frac{24x - 5}{4}$	N1
			<b>4</b>
<b>2</b>		$\frac{6^a}{6^2} + 6^a \times 6^3$ $\frac{6^3}{6^3}$	K1
		$6^a(6^{-2-3} + 6^{3-3})$	K1
		$\frac{6^a(7777)}{7776}$	N1
			<b>3</b>
<b>3</b>		$\frac{1}{2}(\sqrt{5} + \sqrt{2})(x) = 15\sqrt{5} + 20\sqrt{2}$	P1
		$\frac{30\sqrt{5} + 40\sqrt{2}}{\sqrt{5} + \sqrt{2}} \times \frac{\sqrt{5} - \sqrt{2}}{\sqrt{5} - \sqrt{2}}$	K1
		$\frac{30(5) - 30\sqrt{10} + 40\sqrt{10} - 40(2)}{(\sqrt{5})^2 - (\sqrt{2})^2}$	K1
		$\frac{70 + 10\sqrt{10}}{3}$	K1
		$\frac{70}{3} + \frac{10\sqrt{10}}{3}$	N1
			<b>5</b>

Soalan		Skema Pemarkahan	Markah												
4	(a)	$\frac{dy}{dx} = 4x + p$ $4(1) + p = 2$ $p = -2$	K1 K1 N1												
		$\frac{dy}{dx} = 4x - 2 \quad \text{or} \quad 4x - 2 = 0$ $x = \frac{1}{2}$ $y = 2\left(\frac{1}{2}\right)^2 - 2\left(\frac{1}{2}\right) - 4$ $y = -\frac{9}{2}$	K1												
	(b)	<table border="1"> <tr> <td>Nilai <math>x</math></td> <td>0</td> <td><math>\frac{1}{2}</math></td> <td>1</td> </tr> <tr> <td><math>\frac{dy}{dx}</math></td> <td>-ve</td> <td>0</td> <td>+ve</td> </tr> <tr> <td>Lakaran tangen</td> <td>\</td> <td>—</td> <td>/</td> </tr> </table>	Nilai $x$	0	$\frac{1}{2}$	1	$\frac{dy}{dx}$	-ve	0	+ve	Lakaran tangen	\	—	/	K1
Nilai $x$	0	$\frac{1}{2}$	1												
$\frac{dy}{dx}$	-ve	0	+ve												
Lakaran tangen	\	—	/												
		Maka, titik $\left(\frac{1}{2}, -\frac{9}{2}\right)$ adalah titik minimum.	N1												
			7												
5	(a)	$\begin{pmatrix} 7 \\ 12 \end{pmatrix}$	N1												
	(b)	$\begin{pmatrix} -7 \\ 12 \end{pmatrix} + \begin{pmatrix} h \\ 5 \end{pmatrix}$	K1												
		$-7 + h = 10$	K1												
		$\sqrt{10^2 + 17^2}$	K1												
		$h = 17$ dan $k = \frac{1}{\sqrt{389}}$	N1												
			5												

<b>Soalan</b>		<b>Skema Pemarkahan</b>	<b>Markah</b>
<b>6</b>	(a)	$\frac{y}{x^2} = px + q$	P1
	(b)	$p = \frac{8-2}{2-4} @ p = \frac{2-8}{4-2}$	K1
		$p = -3$	N1
		$2 = -3(4) + q @ 8 = -3(2) + q$	K1
		$q = 14$	N1
			<b>5</b>
<b>7</b>	(a)	$1 - \left( \frac{8}{27} + \frac{16}{81} + \frac{1}{81} \right)$ $= \frac{40}{81}$	K1 N1
	(b)	${}^4C_1(p)^1(q)^3 + {}^4C_3(p)^3(q)^1 = \frac{40}{81}$ $4(pq^3 + p^3q) = \frac{40}{81}$ $(pq)(p^2 + q^2) = \frac{10}{81}$	K1 K1 N1
			<b>5</b>
<b>8</b>	(a)	$\frac{4(x+1)^3}{3(1)} + c$ • Pengamiran • Mesti nampak 1	K1
		$\frac{4(x+1)^3}{3} + c$	N1
	(b)	$-1 = \frac{4((0)+1)^3}{3} + c$	K1
		$c = -\frac{7}{3}$	N1
		$y = \frac{4(x+1)^3 - 7}{3}$ atau $y = \frac{4(x+1)^3}{3} - \frac{7}{3}$	N1
			<b>5</b>

Soalan		Skema Pemarkahan	Markah
<b>9</b>	(a)	$T_1 = a$ $T_2 = a + d$ $T_3 = a + d + d$	K1
		$T_1 = a + (1-1)d$ $T_2 = a + (2-1)d$ $T_3 = a + (3-1)d$	K1
		$T_n = a + (n-1)d$	N1
	(b)	$S_5 = a + a + d + a + 2d + a + 3d + a + 4d$	K1
		$S_5 = 5a + 10d$	K1
			<b>5</b>
<b>10</b>		$2x + y + z = 16.00$	N1
		$x + 2y + z = 20.00$	N1
		$x + y + 2z = 18.00$	N1
		Hapuskan salah satu pembolehubah	
		Hapuskan $x, y @ z$ : contoh: $y - z = 2$	K1
		Hapuskan dua pembolehubah , contoh : $4y = 26$	K1
		$x = 2.50$ , donut = 2.50	N1
		$y = 6.50$ , sekotak susu = 6.50	N1
		$z = 4.50$ , kentang goreng = 4.50	N1
			<b>8</b>
<b>11</b>	(a) (i)	$-1 < \log_2 y < 1$	K1
		$\frac{1}{2} < y < 2$	N1
	(a) (ii)	$\frac{\log_2 36}{1 - \log_2 y} = 2$	K1
		$\log_2 36y^2 = 2$ dan $36y^2 = 4$ dilihat	K1
		$y = \frac{1}{3}$	N1
	(b)(i)	$m = 0, 1, -1$	N1
		$\frac{8}{5}$	N1
			<b>7</b>

Soalan		Skema Pemarkahan	Markah
<b>12</b>	(a)	$f(x) = -3 \left[ x^2 + \frac{2}{3}x + \left( \frac{\frac{2}{3}}{2} \right)^2 - \left( \frac{\frac{2}{3}}{2} \right)^2 - \frac{1}{3} \right]$	K1
		$f(x) = -3 \left( x + \frac{1}{3} \right)^2 + \frac{4}{3}$	N1
		Nilai maksimum/ <i>Maximum value</i> = $\frac{4}{3}$	N1
	(b)	 <p>A graph of a downward-opening parabola. The vertex is marked with a dot at <math>\left(-\frac{1}{3}, \frac{4}{3}\right)</math>. The parabola passes through two points labeled on the graph: <math>(-2, -7)</math> and <math>(1, -4)</math>. The x-axis is marked with values <math>-2</math> and <math>1</math>. The y-axis is marked with values <math>-4</math> and <math>-7</math>. Dashed lines connect the points <math>(-2, -7)</math> and <math>(1, -4)</math> to their respective coordinates on the axes.</p>	
		Bentuk graf betul dan paksi dilukis menggunakan pembaris.	P1
		Titik $(-2, -7)$ , $(1, -4)$ dan titik maksimum $\left(-\frac{1}{3}, \frac{4}{3}\right)$ dilabel dengan betul dalam domain yang diberi.	P1
			<b>5</b>

Soalan		Skema Pemarkahan	Markah
13	(a)(i)	$\frac{1}{\sin 2\theta} = 2$	P1
		$\theta = 15^\circ, 75^\circ, 195^\circ, 255^\circ$	N1
	(ii)	$5(1 + \tan^2 \theta) + 14 \tan \theta - 8 = 0$	K1
		$(5 \tan \theta - 1)(\tan \theta + 3) = 0$	K1
		$\theta = 11.31^\circ, 108.43^\circ, 191.31^\circ, 288.43^\circ$	N1
	(b)	$\frac{\tan \theta + \tan 225^\circ}{1 - \tan \theta \tan 225^\circ}$	P1
		$\frac{\frac{p}{\sqrt{1-p^2}} + 1}{1 - \frac{p}{\sqrt{1-p^2}}}$	K1
		$\frac{p + \sqrt{1-p^2}}{\sqrt{1-p^2} - p}$	N1
			8
14	(a)	$10x(15+x) + (x+5)(x+5) = 1100$	K1
		$(11x - 215)(x - 5) = 0$	K1
		$x = -\frac{215}{11} \text{ dan } x = 5$	N1
		$x = 5$	N1
	(b)	$(15+5)(10(5)) = 1000$	P1
		$(x+10)^2 = 1000$	K1
		$x = \frac{-20 \pm \sqrt{(20)^2 - 4(1)(-900)}}{2(1)}$	K1
		$x = 22$	N1
			8

<b>Soalan</b>		<b>Skema Pemarkahan</b>	<b>Markah</b>
<b>15</b>	(a)(i)	$2!4!$ atau $2!3! \times 4$ atau ${}^2P_2 \times {}^3P_3 \times 4$	K1
		48	N1
	(ii)	$\frac{(9-1)!}{2!3!4!} \times \frac{1}{2}$	K1
		70	N1
	(b)(i)	${}^{31}C_3 = 4495$	N1
	(ii)	$\frac{n!}{2!(n-2)!} = 253$	K1
		$\frac{n(n-1)(n-2)!}{(n-2)!} = 506$	K1
		$n = 23$	N1
			<b>8</b>