

KEMENTERIAN PENDIDIKAN  
JABATAN PENDIDIKAN NEGERI TERENGGANU

# **MPP 3**

## **SPM 2026**

# **PERATURAN PEMARKAHAN**

**MATEMATIK TAMBAHAN**

**PERATURAN PEMARKAHAN MATEMATIK TAMBAHAN KERTAS 1**  
**MPP3 TINGKATAN 5 2026**

| No | Skema Pemarkahan                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Σ Markah |
|----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| 1  | <p>Hasil darab semua sebutan untuk menghapuskan satu anu P1</p> <p>Hapuskan anu pertama dengan kaedah penghapusan K1</p> <p>Hapuskan anu kedua dengan kaedah penghapusan K1</p> <p><math>x = -2 @ y = 3 @ z = 4</math> N1<sup>4</sup></p> <p><math>y = 3 \text{ DAN } z = 4 @ x = -2 \text{ DAN } z = 4 @ x = -2 \text{ DAN } y = 3</math> N1<sup>5</sup></p> <p><b>NOTA: Jika N0<sup>4</sup>, N1<sup>5</sup> masih layak diberi markah berdasarkan nilai di N0<sup>4</sup>.</b></p> | 5        |
| 2  | <p>Guna hukum <math>(a^m)^n = a^{mn}</math> K1</p> <p><math>\left[ \frac{x^{5m}}{y^{5m}} \right]</math></p> <p>Guna hukum <math>a^m \times a^n = a^{m+n}</math> ATAU <math>a^m \div a^n = a^{m-n}</math> K1</p> <p><math>[x^m \times x^1 \text{ atau } y^1 \times y^{-m} \text{ atau } \frac{y^1}{y^m}]</math></p> <p><math>xy = \left( \frac{x}{y} \right)^{4m}</math> N1</p>                                                                                                       | 3        |



**SERTAI TELEGRAM @exercise\_students**

|   |                                                                                                                                                                                                                                                                             |                                                   |   |
|---|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|---|
| 3 | <p>(a) <math>y = \frac{3}{500}</math> &amp; <math>z = \frac{3}{5000}</math></p> <p>(b) <math>r = \frac{\left(\frac{3}{5000}\right)}{\left(\frac{3}{500}\right)}</math></p> <p><math>\frac{0.06}{1 - \left[\frac{\frac{3}{5000}}{\frac{3}{500}}\right]}</math></p> <p>15</p> | <p>N1</p> <p>K1</p> <p>K1<br/>N1</p>              | 4 |
| 4 | <p>(a) <math>\overline{QR} = \overline{QP} + \overline{PR}</math></p> <p><math>-5q + 10p</math></p> <p>(b) <math>\overline{QM} = \frac{4}{5}\overline{QR}</math></p> <p><math>5q + \frac{4}{5}(-5q + 10p)</math></p> <p><math>8p + q</math></p>                             | <p>P1</p> <p>N1</p> <p>P1</p> <p>K1</p> <p>N1</p> | 5 |
| 5 | <p><math>\log_5 y = -2 \log_5 x - 2</math></p> <p><math>0 = -2q - 2 \text{ ATAU } \frac{-2-0}{0-q} = -2 \text{ atau } \frac{-2}{-q} = -2</math></p> <p>-1</p>                                                                                                               | <p>K1</p> <p>K1</p> <p>N1</p>                     | 3 |

| 6                 | <p>(a) <math>a = 1</math><br/><math>b = -1</math></p> <p>(b) (i) 8<br/>(ii) <math>y = x + 5</math> dan <math>f^{-1}(x) = x - 5</math><br/><math>2(k - 5) = 8</math> dan selesaikan<br/><math>k = 9</math></p> <p>(c) (i) <math>h = -3</math><br/><math> 5k - 4  = 0</math><br/><math>k = \frac{4}{5}</math></p> <p>(ii) <math>0 \leq g(x) \leq 19</math></p>                                                                                                                                                                                                                                                                                                                                 | <p>N1<br/>N1</p> <p>N1<br/>K1<br/>K1<br/>N1</p> <p>N1<br/>K1<br/>N1</p> <p>N1</p> | 10             |                 |            |               |   |            |               |   |            |               |      |            |               |        |                            |   |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|----------------|-----------------|------------|---------------|---|------------|---------------|---|------------|---------------|------|------------|---------------|--------|----------------------------|---|
| 7                 | <p>(a)</p> <table><tr><th>Fungsi / function</th><th>Pola / pattern</th><th><math>\frac{dy}{dx}</math></th></tr><tr><td><math>y = 2x^0</math></td><td><math>2(0x^{0-1})</math></td><td>0</td></tr><tr><td><math>y = 2x^1</math></td><td><math>2(1x^{1-1})</math></td><td>2</td></tr><tr><td><math>y = 2x^2</math></td><td><math>2(2x^{2-1})</math></td><td><math>4x</math></td></tr><tr><td><math>y = 2x^3</math></td><td><math>2(3x^{3-1})</math></td><td><math>6x^2</math></td></tr></table> <p>Betul semua pola</p> <p>Betul semua <math>\frac{dy}{dx}</math></p> <p>(b) <math>\frac{dy}{dx} = anx^{n-1}</math>, dengan <math>a</math> ialah pemalar dan <math>n</math> ialah integer.</p> | Fungsi / function                                                                 | Pola / pattern | $\frac{dy}{dx}$ | $y = 2x^0$ | $2(0x^{0-1})$ | 0 | $y = 2x^1$ | $2(1x^{1-1})$ | 2 | $y = 2x^2$ | $2(2x^{2-1})$ | $4x$ | $y = 2x^3$ | $2(3x^{3-1})$ | $6x^2$ | <p>P1<br/>P1</p> <p>N1</p> | 3 |
| Fungsi / function | Pola / pattern                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | $\frac{dy}{dx}$                                                                   |                |                 |            |               |   |            |               |   |            |               |      |            |               |        |                            |   |
| $y = 2x^0$        | $2(0x^{0-1})$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0                                                                                 |                |                 |            |               |   |            |               |   |            |               |      |            |               |        |                            |   |
| $y = 2x^1$        | $2(1x^{1-1})$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2                                                                                 |                |                 |            |               |   |            |               |   |            |               |      |            |               |        |                            |   |
| $y = 2x^2$        | $2(2x^{2-1})$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | $4x$                                                                              |                |                 |            |               |   |            |               |   |            |               |      |            |               |        |                            |   |
| $y = 2x^3$        | $2(3x^{3-1})$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | $6x^2$                                                                            |                |                 |            |               |   |            |               |   |            |               |      |            |               |        |                            |   |

|   |                                                                                                                                                                                                                                                                                                                  |   |
|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|
| 8 | <p>(a) <math>\int \frac{3}{u^5} \frac{du}{2}</math>    DAN ganti <math>u = 2x - 1</math>    @setara    K1</p> <p><math>\frac{-3}{8(2x-1)^4} + c</math>    N1</p> <p>(b) <math>2 \int_3^7 g(x) dx</math>    K1</p> <p><math>\int_3^5 f(x) dx - \left( - \int_5^7 f(x) dx \right)</math>    K1</p> <p>19    N1</p> | 5 |
| 9 | <p>(a) 32    N1</p> <p>(b)</p> <div data-bbox="486 806 1181 1220" data-label="Figure"> </div> <p>Lakaran lengkung loceng yang simetri pada paksi y    P1</p> <p>Nilai 0 dan 1.25 dilabel    P1</p> <p>Rantau dilorek dengan betul    P1</p>                                                                      | 4 |



|    |                                                                                                                                                                                                                                                                                                                                      |   |
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| 10 | <p>(a) (i) 40 320 N1</p> <p>(ii) (5-1)! K1</p> <p><math>4! \times 3! \times 2</math> K1</p> <p>288 N1</p><br><p>(b) (i) <math>\frac{n!}{2!(n-2)!} = 15</math> K1</p> <p>Selesaikan persamaan kuadrat K1</p> <p><math>n = 6</math> N1</p><br><p>(ii) <math>{}^3C_2 \times {}^6C_2 + {}^3C_3 \times {}^6C_1</math> K1</p> <p>51 N1</p> | 9 |
| 11 | <p>(a) <math>PA = AB</math> P1</p> <p><math>\sqrt{(x-4)^2 + (y-2)^2} = \sqrt{(6-4)^2 + (-1-2)^2}</math> K1</p> <p><math>x^2 + y^2 - 8x - 4y + 7 = 0</math> N1</p><br><p>(b) <math>\frac{4(1)+x(2)}{2+1} = 6</math> ATAU <math>\frac{2(1)+y(2)}{2+1} = -1</math> K1</p> <p><math>C\left(7, -\frac{5}{2}\right)</math> N1</p>          | 5 |

|    |                                                                                                                                                                                                      |                           |   |
|----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---|
| 12 | (a) 1.257 rad                                                                                                                                                                                        | N1                        | 8 |
|    | (b) Guna $s = j\theta$ @ Guna rumus petua kosinus untuk DE<br>$[5(*1.257)] @ [(14)^2 + (14)^2 - 2(14)(14)\cos*72]$<br>$*BG + *DE + BD + GE$<br>40.74                                                 | K1<br><br>K1<br>N1        |   |
|    | (c) (i) Guna $A = \frac{1}{2} j^2 \theta$<br>$[\frac{1}{2} \times (7)^2 \times 5.027 @ \frac{1}{2} \times (5)^2 \times 5.027]$<br>60.33                                                              | K1<br><br>N1 <sup>6</sup> |   |
|    | (ii) $26 \times *61$ [dibundarkan daripada N1 <sup>6</sup> integer yang hampir]<br>1586 > 1550, tidak mencukupi                                                                                      | K1<br>N1                  |   |
| 13 | (a) (i) 2                                                                                                                                                                                            | N1                        | 8 |
|    | (ii) Guna $\log_a b = \frac{\log_c b}{\log_c a}$                                                                                                                                                     | K1                        |   |
|    | Guna $\log_a mn = \log_a m + \log_a n$ DAN $\log_a m^n = n \log_a m$                                                                                                                                 | K1                        |   |
|    | $\frac{13}{2}$                                                                                                                                                                                       | N1                        |   |
|    | (b) <u>Cari luas trapezium DAN permudah ungkapan surd</u>                                                                                                                                            | K1                        | 8 |
|    | $\frac{1}{2}(4 + \sqrt{4}\sqrt{3})h$                                                                                                                                                                 |                           |   |
|    | $2k \left( \frac{6 + \sqrt{3}}{4 + 2\sqrt{3}} \right) \times \frac{4 - 2\sqrt{3}}{4 - 2\sqrt{3}} @ \left( \frac{12k + 2k\sqrt{3}}{4 + 2\sqrt{3}} \right) \times \frac{4 - 2\sqrt{3}}{4 - 2\sqrt{3}}$ | K1                        |   |
|    | $2k \left( \frac{24 - 12\sqrt{3} + 4\sqrt{3} - 6}{16 - 12} \right) @ \frac{48k - 24k\sqrt{3} + 8k\sqrt{3} - 12k}{16 - 12}$<br>$h = 9k - 4k\sqrt{3}$                                                  | K1<br>N1                  |   |

|           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |          |
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| <p>14</p> | <p>(a) (i) <math>1.8 = a(0-2)^2 + 3.8</math> dan <math>a = -\frac{1}{2}</math> K1</p> <p><math>f(x) = -\frac{1}{2}(x-2)^2 + 3.8</math> N1</p> <p>(ii) Menggunakan rumus kuadratik atau penyempurnaan kuasa dua untuk mencari nilai <math>x</math> K1</p> <p><math>x = 4.757</math> N1</p> <p>(b) (i) <math>v = -2</math> dan <math>w = -4</math> N1</p> <p>(ii) Nilai minimum <math>= -1</math> N1</p> <div data-bbox="512 689 1013 1153"> </div> <p>Anjakan N1</p> <p>Dua titik dilabel di sebelah kiri dan kanan titik minimum N1</p> | <p>8</p> |
| <p>15</p> | <p>(a) (i) <math>p</math> N1</p> <p>(ii) <math>-\frac{1}{p}</math> N1</p> <p>(b) <math>(2 \sin x \cos x)(2 \sin y \cos y)</math> K1</p> <p>Ganti <math>\sin x \cos y = p</math> atau <math>\cos x \sin y = q</math> K1</p> <p><math>4pq</math> N1</p> <p>(c) Guna <math>1 - 2 \sin^2 x</math> K1</p> <p><math>x = 0^\circ</math> dan <math>\angle</math> rujukan <math>30^\circ</math> N1</p> <p><math>x = -180^\circ, -150^\circ, -30^\circ, 0^\circ, 180^\circ, 210^\circ, 330^\circ, 360^\circ</math> N1</p>                         | <p>8</p> |



**PERATURAN PERMARKAHAN MATEMATIK TAMBAHAN KERTAS 2**  
**PEPERIKSAAN PERCUBAAN SPM 2026**

| No |     | Peraturan Pemarkahan                                                                                                                                                                                                                                                                                                     | Jumlah |
|----|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|
| 1  | (a) | $\frac{2}{3+2f(x)} = \frac{2}{2x^2+3}$ <p style="text-align: right;">K1</p> $f(x) = x^2$ <p style="text-align: right;">N1</p>                                                                                                                                                                                            | 7      |
|    | (b) | $(-2r)^2 - 4(1)(2-r) > 0$ <p style="text-align: right;">P1</p> $(r+2)(r-1) > 0$ dan selesaikan ketaksamaan kuadratik. <p style="text-align: right;">K1</p> $r < -2, r > 1$ <p style="text-align: right;">N1</p>                                                                                                          |        |
|    | (c) | $h(x) = -2 \left[ x^2 - \frac{k}{2}x + \left( \frac{-\frac{k}{2}}{2} \right)^2 - \left( \frac{-\frac{k}{2}}{2} \right)^2 - \frac{k}{2} \right]$ <p style="text-align: right;">K1</p> $h(x) = -2 \left( x - \frac{k}{4} \right)^2 + \frac{k^2}{8} + k$ <p style="text-align: right;">N1</p>                               |        |
| 2  | (a) | Cari $m_{AB}$ dan ganti ke dalam<br>$y - 0 = m(x - (-3)) @ (0) = m(-3) + c$ & selesaikan untuk $c$ <p style="text-align: right;">K1</p> $y = 4x + 12$ <p style="text-align: right;">N1</p>                                                                                                                               | 6      |
|    | (b) | (i) Cari luas $\Delta ABC$ menggunakan rumus $L = \left[ \frac{1}{2}   ( ) - ( )   \right]$ <p style="text-align: right;">K1</p> $2 \times L_{ABC}$ <p style="text-align: right;">K1</p> 11 <p style="text-align: right;">N1</p> (ii) $\left( \frac{m-1}{2}, \frac{n-3}{2} \right)$ <p style="text-align: right;">N1</p> |        |

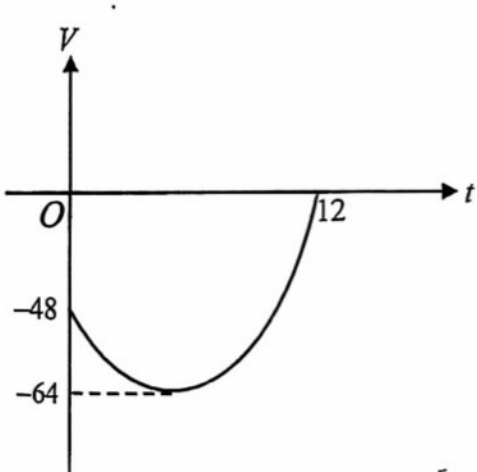
|   |     |                                                                                                                                                                                                                                                                                                         |                                              |   |
|---|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|---|
| 3 | (a) | $\cos \angle AOB = \frac{6}{12} @ \sin \angle AOB = \frac{\sqrt{108}}{12} @ \tan \angle AOB = \frac{\sqrt{108}}{6}$<br><br>$\frac{\pi}{3}$                                                                                                                                                              | P1<br><br>N1                                 | 6 |
|   | (b) | Cari luas $\triangle OED$ , $L_1$<br><br><u>Cari luas sektor DEC @ AOB</u><br>$L_2 = \frac{1}{2} \times (6\sqrt{3})^2 \times \frac{\pi}{2} @ L_3 = \frac{1}{2} \times (24)^2 \times \frac{\pi}{3}$<br><br>$*L_3 - *L_1 - *L_2$<br><br>$3(23\pi - 6\sqrt{3})$                                            | K1<br><br>K1<br><br>K1<br><br>N1             |   |
| 4 | (a) | <u>Kamir</u> $\int y \, dy @ \int 4y - y^2 \, dy$<br>$\left[ L_1 = \frac{y^2}{2} @ L_2 = \frac{4y^2}{2} - \frac{y^3}{3} \right]$<br>Cari luas segi tiga $L_1 = \frac{1}{2}(3)(3) @$ Guna had $\int_0^3$ dalam $L_1$<br><br>$@$ Guna had $\int_3^4$ dalam $L_2$<br><br>$L_1 + L_2$<br><br>$\frac{37}{6}$ | K1<br><br><br><br><br>K1<br><br>K1<br><br>N1 | 7 |
|   | (b) | <u>Kamir</u> $\int -3x^2 + 4x + 5 \, dx$<br><br>Ganti (3, 3) ke dalam $y = -\frac{3x^3}{3} + \frac{4x^2}{2} + 5x + c$ & selesaikan untuk $c$<br><br>$g(x) = -x^3 + 2x^2 + 5x - 3$                                                                                                                       | K1<br><br>K1<br><br>N1                       |   |

|   |         |                                                                                                                                                                                                                             |                        |   |
|---|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|---|
| 5 | (a)     | $\frac{2 \tan x}{\sec^2 x}$ [Guna identiti $1 + \tan^2 x = \sec^2 x$ ]<br><br>Guna $\tan x = \frac{\sin x}{\cos x}$ dan $\sec^2 x = \frac{1}{\cos^2 x}$<br><br>$2 \sin x \cos x$ [Ditunjukkan dalam pengiraan]<br>$\sin 2x$ | P1<br><br>K1<br><br>N1 | 9 |
|   | (b) (i) | <p>Bentuk Sinus<br/>           Satu kitaran dalam <math>0 \leq x \leq \pi</math> &amp; Amplitud = 3<br/>           Graf Modulus<br/>           [Paksi x, paksi y dan O tidak dilabel P1P0P0]</p>                            | P1<br>P1<br>P1         |   |
|   | (ii)    | $y = 2 - \frac{2x}{\pi}$<br><br>Lakar garis lurus $y = 2 - \frac{2x}{\pi}$<br><br>4                                                                                                                                         | N1<br><br>K1<br><br>N1 |   |
|   |         |                                                                                                                                                                                                                             |                        |   |
| 6 |         | $(3y)(7x) = 189$                                                                                                                                                                                                            | P1                     | 9 |
|   |         | $18x + 6y = 63$                                                                                                                                                                                                             | P1                     |   |
|   |         | Ungkap $x$ dalam sebutan $y$ @ $y$ dalam sebutan $x$                                                                                                                                                                        | P1                     |   |
|   |         | Hapuskan satu anu [kaedah penggantian atau penghapusan]                                                                                                                                                                     | K1                     |   |
|   |         | Selesaikan persamaan kuadratik                                                                                                                                                                                              | K1                     |   |
|   |         | $x = \frac{3}{2}, x = 2$                                                                                                                                                                                                    | N1                     |   |
|   |         | $y = 6, y = \frac{9}{2}$                                                                                                                                                                                                    | N1                     |   |
|   |         | $\frac{1}{2}(3.142)\left(\frac{*10.5}{2}\right)^2 (h) = 34.65$                                                                                                                                                              | K1                     |   |
|   |         | 0.8002                                                                                                                                                                                                                      | N1                     |   |

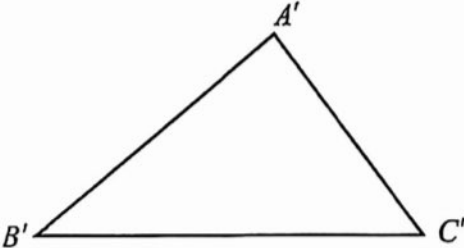
|                            |                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                       |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
|----------------------------|--------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|-----|---|---|---|-----------------|----|---|---|----------------------------|---|---|---|----------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--------------|--------------------------------------------------------------------------------------|
| 7                          | (a)                                                                                  | $a = 36\pi$ & $d = 18\pi$ (dilihat) <b>P1</b><br>$V_n = 36\pi + (n-1)(18\pi)$ <b>K1</b><br>$V_n = 18\pi(n+1)$ <b>N1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 6                                                                                     |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
|                            | (b)                                                                                  | $S_5 = \frac{5}{2}[2(36\pi) + (5-1)(18\pi)]$ @ $S_{13} = \frac{13}{2}[2(36\pi) + (13-1)(18\pi)]$ <b>K1</b><br>$S_n - S_5$ <b>K1</b><br>$1512\pi \text{ cm}^3$ <b>N1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                       |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
| 8                          | (a)                                                                                  | Beza $x^2 - 2x + 3$ terhadap $x$ & ganti $x = 2$ <b>K1</b><br>Guna $m_1 m_2 = -1$ <b>K1</b><br>Ganti (2,3) ke dalam $y = -\frac{1}{2}x + c$ dan selesaikan untuk $c$<br>@ Ganti (2,3) ke dalam $y - y_1 = -\frac{1}{2}(x - x_1)$ <b>K1</b><br>$y = -\frac{1}{2}x + 4$ <b>K1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 10                                                                                    |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
|                            | (b)                                                                                  | $\frac{dy}{dx} = 0$ dan selesaikan <b>K1</b><br><u>Lakaran Tangen (semua betul)</u> <b>K1</b> <table border="1"> <tr> <td><math>x</math></td> <td>0</td> <td>1</td> <td>2</td> </tr> <tr> <td><math>\frac{dy}{dx}</math></td> <td>-2</td> <td>0</td> <td>2</td> </tr> <tr> <td>Tanda bagi <math>\frac{dy}{dx}</math></td> <td>-</td> <td>0</td> <td>+</td> </tr> <tr> <td>Lakaran tangen</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Lakaran graf</td> <td colspan="3"></td> </tr> </table><br>Titik minimum (1,2) <b>N1</b> |                                                                                       | $x$ | 0 | 1 | 2 | $\frac{dy}{dx}$ | -2 | 0 | 2 | Tanda bagi $\frac{dy}{dx}$ | - | 0 | + | Lakaran tangen |  |  |  | Lakaran graf |  |
| $x$                        | 0                                                                                    | 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2                                                                                     |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
| $\frac{dy}{dx}$            | -2                                                                                   | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2                                                                                     |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
| Tanda bagi $\frac{dy}{dx}$ | -                                                                                    | 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | +                                                                                     |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
| Lakaran tangen             |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |  |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
| Lakaran graf               |  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                                                       |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |
|                            | (c)                                                                                  | Ganti $x = 2$ ke dalam $\frac{dy}{dx} = 2x - 2$ <b>K1</b><br>Guna petua rantai $\left[ \frac{dy}{dt} = \frac{dy}{dx} \times \frac{dx}{dt} \right]$ <b>K1</b><br>5 <b>N1</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                       |     |   |   |   |                 |    |   |   |                            |   |   |   |                |                                                                                     |                                                                                     |                                                                                       |              |                                                                                      |



|                 |                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                |                                    |      |      |      |      |      |      |                                  |    |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|------|------|------|------|------|------|----------------------------------|----|
| 9               | (a)                                                                                                                                                     | (i) $np = 40$ atau $\sqrt{npq} = 4$<br>Selesaikan persamaan serentak [ $40q = 16$ ]<br>$p = 0.6$<br><br>(ii) ${}^{10}C_3(0.6)^3(0.4)^7$<br>0.04247                                                                                                                                                                                             | P1<br>K1<br>N1<br><br>K1<br>N1     | 10   |      |      |      |      |      |                                  |    |
|                 | (b)                                                                                                                                                     | Tulis $P\left(Z > \frac{35-27}{3.2}\right)$ atau $P\left(Z < \frac{m-27}{3.2}\right) = 0.266$<br>dalam (i) atau (ii)<br><br>(i) 0.00621<br><br>(ii) 0.625 @ -0.625 [dilihat]<br>$\frac{m-27}{3.2} = -0.625$<br>25                                                                                                                              | P1<br><br>N1<br><br>P1<br>K1<br>N1 |      |      |      |      |      |      |                                  |    |
| 10              | (a)                                                                                                                                                     | <table border="1"><tr><td><math>\frac{y^2}{x}</math></td><td>0.03</td><td>0.15</td><td>0.27</td><td>0.40</td><td>0.58</td><td>0.69</td></tr></table><br>Graf garis lurus $\frac{y^2}{x}$ melawan $x$ dilukis<br>& sekurang-kurangnya satu *titik diplot dengan betul<br><br>6 *titik diplot dengan betul<br><br>Garis lurus penyuaian terbaik. | $\frac{y^2}{x}$                    | 0.03 | 0.15 | 0.27 | 0.40 | 0.58 | 0.69 | N1<br><br>K1<br><br>N1<br><br>N1 | 10 |
| $\frac{y^2}{x}$ | 0.03                                                                                                                                                    | 0.15                                                                                                                                                                                                                                                                                                                                           | 0.27                               | 0.40 | 0.58 | 0.69 |      |      |      |                                  |    |
| (b)             | (i) $\frac{y^2}{x} = 0.34$ (dilihat)<br>3.8<br>(ii) $\frac{y^2}{x} = ax - b$<br>$a = \frac{0.58 - (-0.06)}{6 - 0}$<br>$a = 0.1067$<br>$b = 0.06$ / 0.06 | P1<br>N1<br>P1<br>K1<br>N1<br>N1                                                                                                                                                                                                                                                                                                               |                                    |      |      |      |      |      |      |                                  |    |

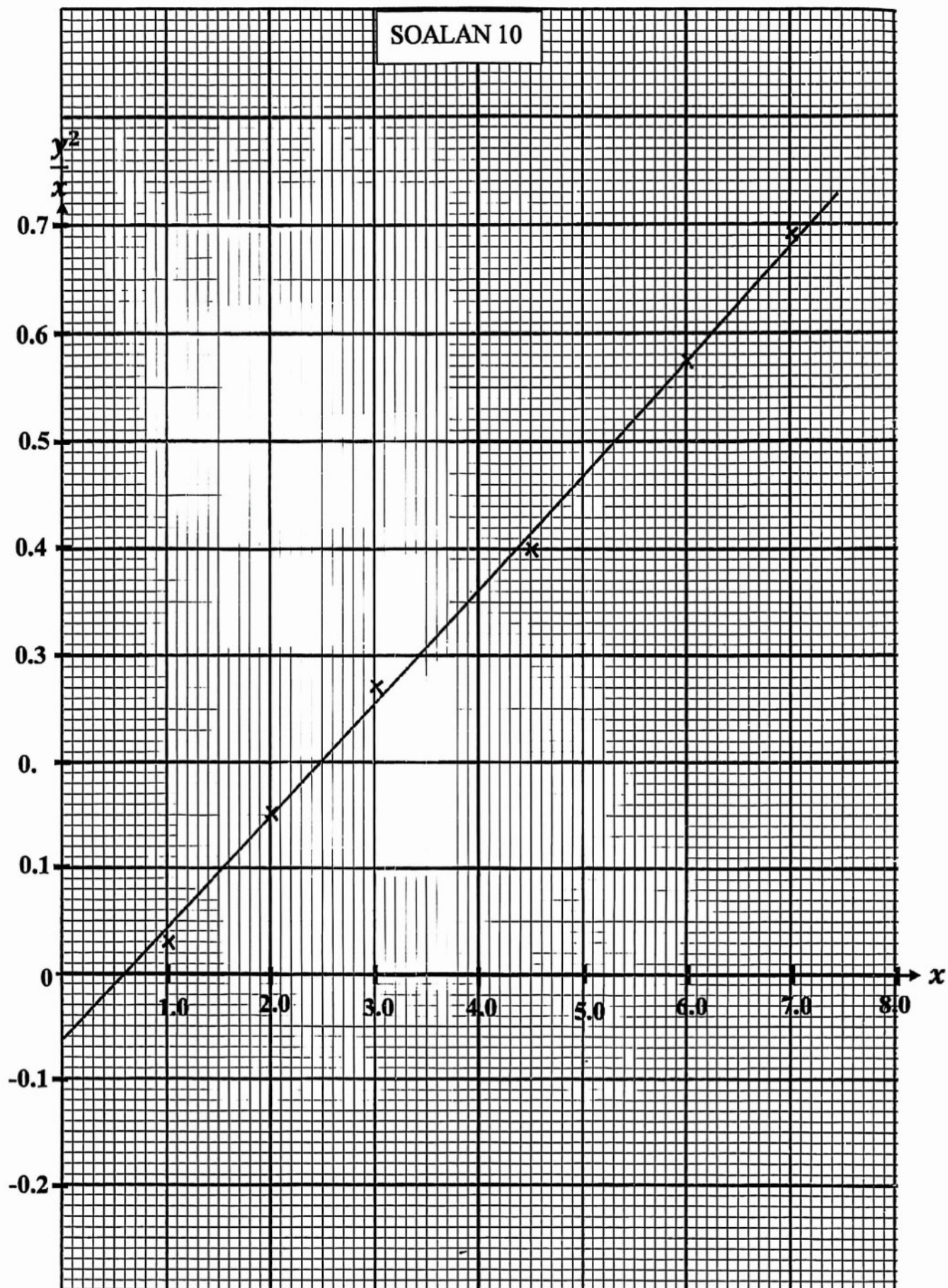
|    |      |                                                                                                                                                                                                                                                                                                    |                      |    |
|----|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----|
| 11 | (a)  | Tulis hukum segi tiga dalam a(i) @ a(ii)                                                                                                                                                                                                                                                           | K1                   | 10 |
|    | (i)  | $-8\underline{s} + 4\underline{t}$                                                                                                                                                                                                                                                                 | N1                   |    |
|    | (ii) | $8\underline{s} + \frac{1}{5}(-8\underline{s} + 10\underline{t})$<br>$\frac{32}{5}\underline{s} + 2\underline{t}$                                                                                                                                                                                  | K1<br>N1             |    |
|    | (b)  | (i) $-8m\underline{s} + 4n\underline{t}$                                                                                                                                                                                                                                                           | N1                   |    |
|    |      | (ii) $\frac{32}{5}n\underline{s} + 2n\underline{t}$                                                                                                                                                                                                                                                | N1                   |    |
|    | (c)  | $-\frac{8}{5}\underline{s} + 2\underline{t} = \left(-8m + \frac{32}{5}n\right)\underline{s} + (4m + 2n)\underline{t}$<br><br>$-\frac{8}{5} = -8m + \frac{32}{5}n \quad @ \quad 2 = 4m + 2n$<br><br>Selesaikan persamaan serentak<br><br>$m = \frac{5}{13} \quad \text{dan} \quad n = \frac{3}{13}$ | K1<br>K1<br>K1<br>N1 |    |
| 12 | (a)  | (i) $2t - 8 = 0$ dan selesaikan<br>$v = t^2 - 8t - 48$<br>$v = (4)^2 - 8(4) - 48$<br>$-64$                                                                                                                                                                                                         | K1<br>K1<br>K1<br>N1 | 10 |
|    |      | (ii) $t^2 - 8t - 48 = 0$ dan selesaikan<br>12                                                                                                                                                                                                                                                      | K1<br>N1             |    |
|    | (b)  |                                                                                                                                                                                                                 | N1 ( semua betul )   |    |



|    |     |                                                                                                                                                                                                                                                                               |                      |    |
|----|-----|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----|
|    |     | $s = \frac{t^3}{3} - 4t^2 - 48t$<br>$\left[ \left[ \frac{12^3}{3} - 4(12)^2 - 48(12) \right] - \left[ \frac{0^3}{3} - 4(0)^2 - 48(0) \right] \right]$<br>576                                                                                                                  | K1<br>K1<br>N1       |    |
| 13 | (a) | $\frac{1}{2}(3.5)(4 \log_2 a)(\sin 30^\circ) = 7$<br>$\log_2 a = 2$<br>$a = 4$                                                                                                                                                                                                | K1<br>K1<br>N1       | 10 |
|    | (b) | $(AC)^2 = 8^2 + 3.5^2 - 2(8)(3.5)(\cos 40^\circ)$<br>$*8 + 3.5 + *5.775 = 6.25$<br><del>17.28</del> 16.77                                                                                                                                                                     | K1<br>K1<br>N1       |    |
|    | (c) | (i) <div style="text-align: center;">  </div> (ii) <del>62.93</del> 45.29°<br>$\frac{1}{2}(8)(5.775)\sin 77.07^\circ$ atau setara $\frac{1}{2}(8)(5.625)\sin 104.71^\circ$<br>22.51 21.77° | N1<br>P1<br>K1<br>N1 |    |
| 14 | (a) | $25x + 35y \geq 2000$ @ setara<br>$y \leq 3x$ @ setara<br>$x \leq 50$                                                                                                                                                                                                         | N1<br>N1<br>N1       | 10 |
|    | (b) | Rujuk Lampiran (graf)<br>Satu garis lurus di lukis dengan betul<br>Semua garis lurus dilukis dengan betul<br>Rantau R dilorek dan dilabel dengan betul                                                                                                                        | K1<br>N1<br>N1       |    |
|    | (c) | (i) $44 \leq y \leq 60$<br>(ii) Lukis $k = 18x + 22y$ dan ganti mana-mana titik di dalam rantau<br>Ganti (16, 46) dalam $18x + 22y$<br>1300                                                                                                                                   | N1<br>K1<br>K1<br>N1 |    |

|    |     |                                                                       |    |    |
|----|-----|-----------------------------------------------------------------------|----|----|
| 15 | (a) | $\frac{120}{96} \times 100$                                           | K1 | 10 |
|    |     | 125                                                                   | N1 |    |
|    | (b) | (i) $\frac{125 \times 120}{100}$ atau $\frac{150 \times 110}{100}$    | K1 |    |
|    |     | 165                                                                   | N1 |    |
|    |     | 150                                                                   | N1 |    |
|    |     | (ii) $\frac{150k + 118(5) + 110(4) + 165k}{k + 5 + 4 + k} = 127.7$    | K1 |    |
|    |     | 2                                                                     | N1 |    |
|    | (c) | (i) Membeli-belah kerana mempunyai pemberat paling besar<br>iaitu 5 . | N1 |    |
|    |     | (ii) $\frac{100 \times 140.42}{118}$                                  | K1 |    |
|    |     | 19%                                                                   | N1 |    |







# SOALAN 14

