

**SULIT**

**1449/2**

**Matematik**

**Kertas 2**

**Peraturan**

**Pemarkahan**

**2025**



**PEPERIKSAAN PERCUBAAN SPM 2025  
TINGKATAN 5**

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**MATEMATIK  
KERTAS 2**

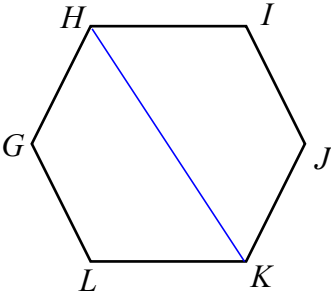
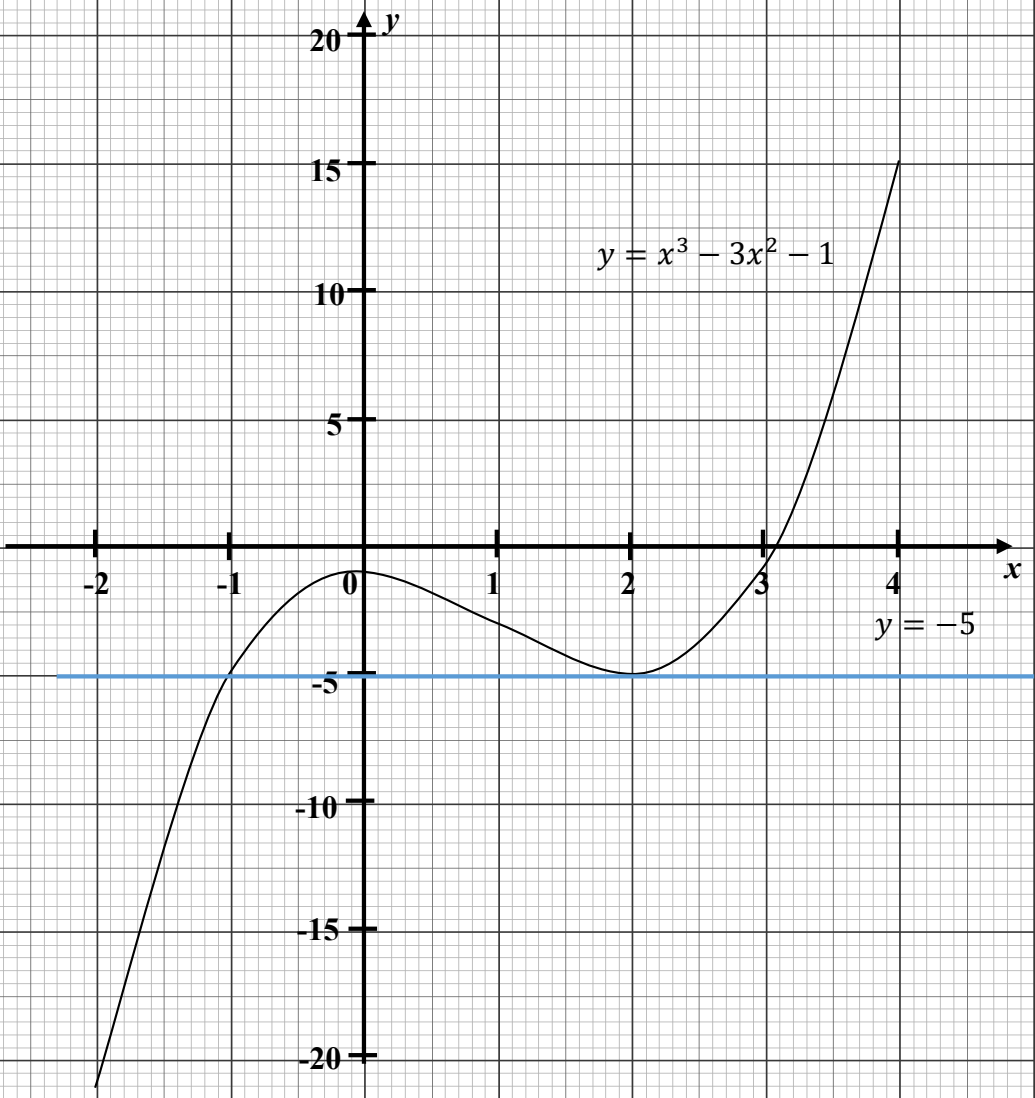
**PERATURAN PEMARKAHAN**

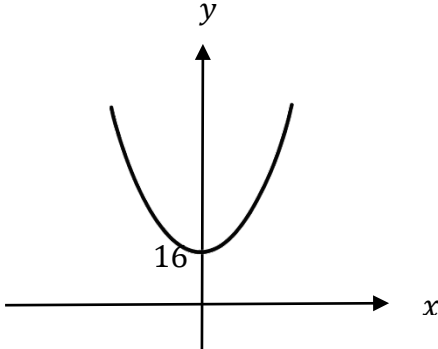
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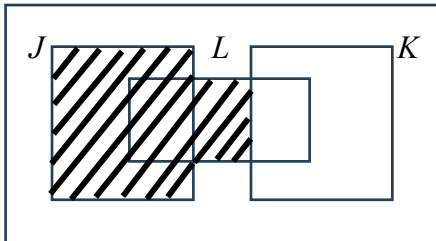
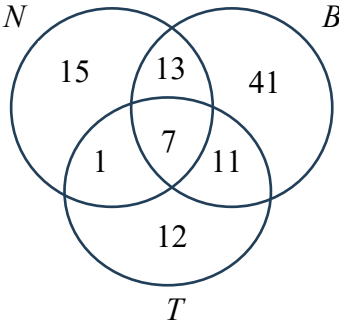
**Peraturan pemarkahan ini mengandungi 12 halaman bercetak**

**[Lihat sebelah**

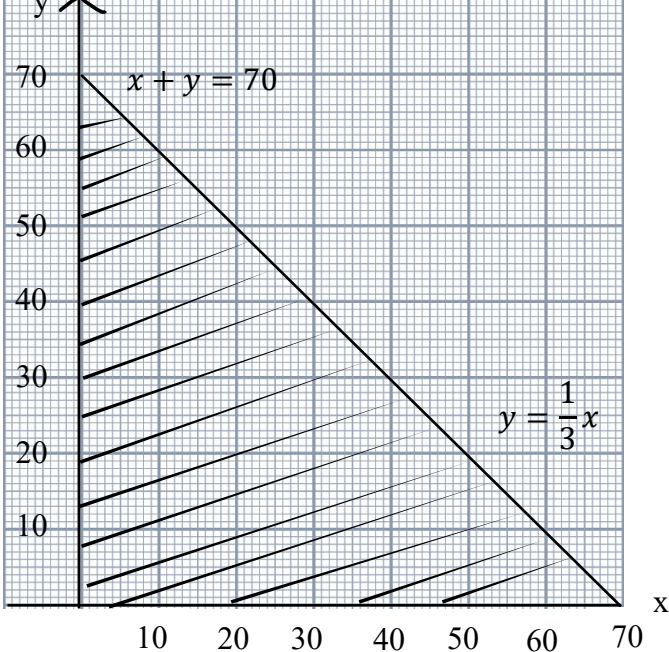
| No | Jawapan |                                                                                                                                                                                                | Markah |   |
|----|---------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|
| 1  | (a)     | (i) Heksagon                                                                                                                                                                                   | 1      | 3 |
|    |         | (ii)  <p>Mana-mana garis lurus HK atau HJ atau HL atau IL atau IG atau IK atau JG atau JL atau KG dilukis</p> | 1      |   |
|    | (b)     | $60^\circ$                                                                                                                                                                                     | 1      |   |
| 2  | (a)     |                                                                                                                                                                                                |        |   |
|    |         |  <p><math>y = x^3 - 3x^2 - 1</math></p> <p><math>y = -5</math></p>                                          |        |   |
|    |         | Garis lurus $y = -5$ dilukis dengan betul                                                                                                                                                      | 1      | 3 |

| No | Jawapan                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                            | Markah              |   |
|----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---|
|    | (b)                                                                                                                                                                                                                                                                                                                                           | $(-1, -5)$<br>$(2, -5)$                                                                                                                    | 1<br>1              |   |
| 3  | (a)                                                                                                                                                                                                                                                                                                                                           |  <p>Y=16 dilihat<br/>Bentuk graf dilukis dengan betul</p> | 1<br>1              | 5 |
|    | (b)                                                                                                                                                                                                                                                                                                                                           | $x(x + 4) = 1020$<br>$x^2 + 4x - 1020 = 0$<br>$(x - 30)(x + 34) = 0$<br>$x = 30, x = -34$<br>Panjang = 34                                  | 1<br><br>1<br><br>1 |   |
| 4  | (a)                                                                                                                                                                                                                                                                                                                                           | sebilangan                                                                                                                                 | 1                   | 4 |
|    | (b)                                                                                                                                                                                                                                                                                                                                           | Benar                                                                                                                                      | 1                   |   |
|    | (c)                                                                                                                                                                                                                                                                                                                                           | Jika 12 boleh dibahagi tepat dengan 2, maka 12 ialah nombor genap.                                                                         | 1                   |   |
|    | (d)                                                                                                                                                                                                                                                                                                                                           | Kuat                                                                                                                                       | 1                   |   |
| 5  | $6x + 7y = 222$ atau<br>$7x + 7y = 238$<br><br>$\begin{pmatrix} 6 & 7 \\ 7 & 7 \end{pmatrix} \begin{pmatrix} x \\ y \end{pmatrix} = \begin{pmatrix} 222 \\ 238 \end{pmatrix}$<br><br>$\begin{pmatrix} x \\ y \end{pmatrix} = \frac{1}{6(7) - (7)(7)} \begin{pmatrix} 7 & -7 \\ -7 & 6 \end{pmatrix} \begin{pmatrix} 222 \\ 238 \end{pmatrix}$ |                                                                                                                                            | 1<br><br>1<br><br>1 |   |

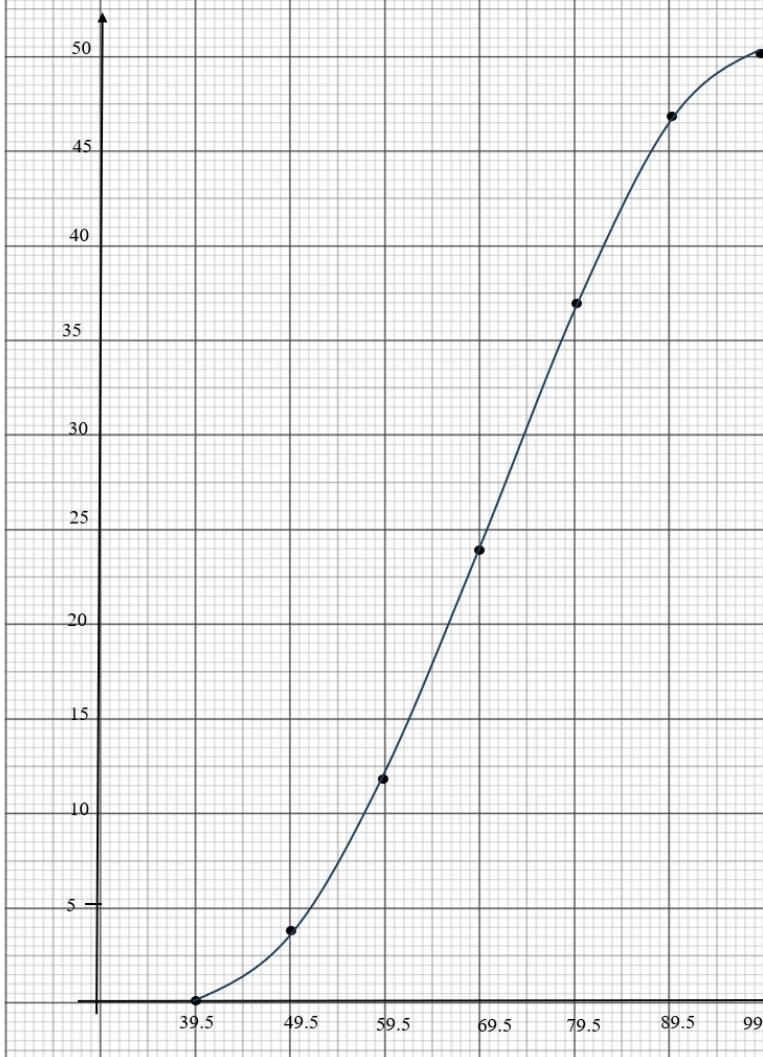
| No | Jawapan                                |                                                                                                                                                                                           | Markah          |        |
|----|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|--------|
|    | $x = \text{RM}16$<br>$y = \text{RM}18$ |                                                                                                                                                                                           |                 | 1<br>1 |
| 6  | (a)                                    | 30 minit                                                                                                                                                                                  | 1               | 4      |
|    | (b)                                    | $\frac{200}{2.5}$ atau $80 \text{ km j}^{-1}$ atau $\frac{200}{3}$ atau $66.67 \text{ km j}^{-1}$<br><br>$80 - 66.67$<br>$= 13.33 \text{ km j}^{-1}$                                      | 1<br><br>1<br>1 |        |
| 7  | (a)                                    | Insurans motor @ insurans kebakaran @ insurans perubatan dan kesihatan @ insurans kemalangan diri @ insurans perjalanan.                                                                  | 1               | 4      |
|    | (b)                                    | $\frac{75}{100} \times 1971.70 - \frac{45}{100} \times 1478.78$<br><br>$\frac{75}{100} \times 1971.70$ atau $\frac{45}{100} \times 1478.78$ atau $1478.78$ atau $665.44$ beri 1<br>813.33 | 2<br><br>1      |        |
| 8  | (a)                                    | Gaji bulanan @ gaji kerja separuh masa @ jawapan yang sesuai.                                                                                                                             | 1               | 4      |
|    | (b)                                    | $(1\,200 + 360) - (450 + 500 + 250 + 380)$ atau setara 20<br>Aliran tunai negatif                                                                                                         | 1<br>1<br>1     |        |
| 9  | (a)                                    | (i) 2                                                                                                                                                                                     | 1               | 5      |
|    |                                        | (ii) $180^\circ$                                                                                                                                                                          | 1               |        |
|    | (b)                                    | $\sin \theta = \frac{7}{12}$<br>$35^\circ 41'$ @ $35.6853^\circ$<br>$144^\circ 18'$ @ $144.31$                                                                                            | 1<br>1<br>1     |        |
| 10 | $(3150 + 270) - 3150$<br>720<br>22.86% |                                                                                                                                                                                           | 1<br>1<br>1     | 3      |

| No | Jawapan |                                                                                                                                                                                                                          |                                                                                                                                                              | Markah           |   |
|----|---------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---|
| 11 | (a)     | (i)                                                                                                                                                                                                                      | $M \subset P$                                                                                                                                                | 1                |   |
|    |         | (ii)                                                                                                                                                                                                                     | <div><math>\xi</math><br/><br/><br/>Lorek <math>(J \cup L) - K</math></div> | 2                |   |
|    | (b)     | <div><br/><br/>3 Set dilukis dan dilabel dengan betul<br/>13, 1 dan 11<br/>15, 41 dan 12 (betul mana-mana dua – P1)<br/><br/>100</div> |                                                                                                                                                              | 1<br>1<br>2<br>1 | 8 |
| 12 | (a)     | $(-5)^2 < (-6)^2$                                                                                                                                                                                                        |                                                                                                                                                              | 1                |   |
|    | (b)     | (i)                                                                                                                                                                                                                      | $x + y \leq 70$<br>$y \geq \frac{1}{3}x$ atau setara                                                                                                         | 1<br>1           |   |

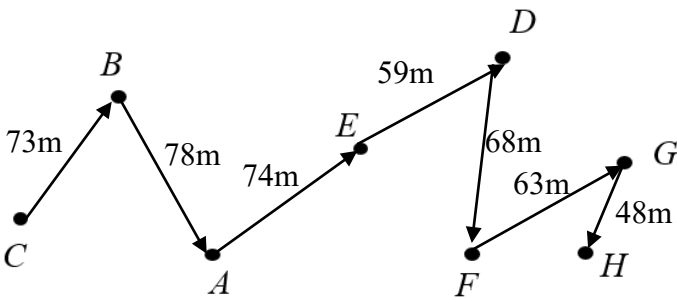


| No | Jawapan |                                                                                                                                                                                                                                                                                   | Markah                          |   |
|----|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|---|
|    |         | <p>(ii)</p>  <p>Paksi seragam<br/>         Garisan <math>x + y = 70</math><br/>         Garisan <math>y = \frac{1}{3}x</math><br/>         Melorek Rantau yang memuaskan sistem ketaksamaan</p> | <p>1<br/>1<br/>1<br/>1</p>      |   |
|    |         | <p>(iii)</p> <p>Minimum = 10<br/>         Maksimum = 40</p>                                                                                                                                                                                                                       | <p>1<br/>1</p>                  |   |
| 13 | (a)     | <p>Derma / derma kepada badan kebajikan Zakat</p>                                                                                                                                                                                                                                 | <p>1<br/>1</p>                  |   |
|    | (b)     | <p>Pendapatan bercukai :<br/> <math>= 61\,520 - 400 - 2\,700 - 7\,000 - 1\,150 - 9\,000</math><br/> <math>= 41\,270</math></p> <p>Cukap pendapatan perlu dibayar :<br/> <math>= 600 + \frac{6}{100} \times 6270 - 350</math><br/> <math>= RM626.20</math></p>                     | <p>1<br/>1<br/><br/>1<br/>1</p> | 9 |
|    | (c)     | <p>PCB :<br/> <math>= 12 \times 230</math><br/> <math>= RM2\,760</math></p>                                                                                                                                                                                                       | <p>1</p>                        |   |

| No                     | Jawapan                                            |                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  | Markah |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
|------------------------|----------------------------------------------------|---------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------|---|------------------------|----------------------------------------------------|------------------------------------------------------------|-----------------------------------------------|---------|---|---|------|---------|---|---|------|---------|---|----|------|---------|----|----|------|---------|----|----|------|---------|----|----|------|---------|---|----|------|------------|--|
|                        |                                                    | PCB lebih besar daripada cukai yang perlu dibayar. LHDN akan memulangkan RM2 133.80 kepada Megat. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |  |        | 2 |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
| 14                     | (a)                                                | (i)                                                                                               | 35                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |  |        |   | 1                      |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
|                        |                                                    | (ii)                                                                                              | $\frac{52+53+60+60+61+64+79+84+87}{9}$ <i>atau</i> 66.67<br>$\sqrt{\frac{52^2 + 53^2 + 60^2 + 60^2 + 61^2 + 64^2 + 79^2 + 84^2 + 87^2}{9} - 66.67^2}$<br>12.45                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |  |        |   | 1<br><br>1<br><br>1    |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
|                        | (b)                                                | (i)                                                                                               | <table><tr><th>Markah<br/><i>Marks</i></th><th>Bilangan<br/>murid<br/><i>Number of<br/>students</i></th><th>Kekerapan<br/>longgokan<br/><i>Cummulative<br/>frequency</i></th><th>Sempadan<br/>Atas<br/><i>Upper<br/>boundary</i></th></tr><tr><td>30 – 39</td><td>0</td><td>0</td><td>39.5</td></tr><tr><td>40 – 49</td><td>4</td><td>4</td><td>49.5</td></tr><tr><td>50 – 59</td><td>8</td><td>12</td><td>59.5</td></tr><tr><td>60 – 69</td><td>12</td><td>24</td><td>69.5</td></tr><tr><td>70 – 79</td><td>13</td><td>37</td><td>79.5</td></tr><tr><td>80 – 89</td><td>10</td><td>47</td><td>89.5</td></tr><tr><td>90 – 99</td><td>3</td><td>50</td><td>99.5</td></tr></table> |  |        |   | Markah<br><i>Marks</i> | Bilangan<br>murid<br><i>Number of<br/>students</i> | Kekerapan<br>longgokan<br><i>Cummulative<br/>frequency</i> | Sempadan<br>Atas<br><i>Upper<br/>boundary</i> | 30 – 39 | 0 | 0 | 39.5 | 40 – 49 | 4 | 4 | 49.5 | 50 – 59 | 8 | 12 | 59.5 | 60 – 69 | 12 | 24 | 69.5 | 70 – 79 | 13 | 37 | 79.5 | 80 – 89 | 10 | 47 | 89.5 | 90 – 99 | 3 | 50 | 99.5 | 1<br><br>1 |  |
| Markah<br><i>Marks</i> | Bilangan<br>murid<br><i>Number of<br/>students</i> | Kekerapan<br>longgokan<br><i>Cummulative<br/>frequency</i>                                        | Sempadan<br>Atas<br><i>Upper<br/>boundary</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |  |        |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
| 30 – 39                | 0                                                  | 0                                                                                                 | 39.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |        |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
| 40 – 49                | 4                                                  | 4                                                                                                 | 49.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |        |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
| 50 – 59                | 8                                                  | 12                                                                                                | 59.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |        |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
| 60 – 69                | 12                                                 | 24                                                                                                | 69.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |        |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
| 70 – 79                | 13                                                 | 37                                                                                                | 79.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |        |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
| 80 – 89                | 10                                                 | 47                                                                                                | 89.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |        |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |
| 90 – 99                | 3                                                  | 50                                                                                                | 99.5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |  |        |   |                        |                                                    |                                                            |                                               |         |   |   |      |         |   |   |      |         |   |    |      |         |    |    |      |         |    |    |      |         |    |    |      |         |   |    |      |            |  |

| No | Jawapan |                                                   |                                                                                                                                                                                                                             | Markah           |   |
|----|---------|---------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---|
|    |         | (ii)                                              |  <p>Skala seragam 1 markah<br/> Plot 7 titik yang betul 2 markah<br/> Nota: Plot 5-6 titik 1 markah<br/> Graf dilukis dengan licin 1</p> | 1<br>1<br>1<br>1 | 9 |
| 15 | (a)     | Teselasi<br>Corak yang berulang tanpa pertindihan |                                                                                                                                                                                                                             | 1<br>1           |   |
|    | (b)     | (i)                                               | (a) pantulan pada garis $x = 1$<br>(b) pembesaran faktor skala = 3 pada pusat pembesaran (3,1)                                                                                                                              | 2<br>3           |   |
|    |         | (ii)                                              | $3^2 \times 24 @ 216$<br>192                                                                                                                                                                                                | 1<br>1           | 9 |
| 16 | (a)     | (i)                                               | 400 + 900<br><br>1300 m                                                                                                                                                                                                     | 1                | 4 |

| No | Jawapan |      |                                                                                                                                                            | Markah               |   |
|----|---------|------|------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|---|
|    |         |      | Jarak terpendek berbanding laluan yang lain                                                                                                                | 1                    |   |
|    |         | (ii) | $300 + 1200 + 550$<br>$= 2050 \text{ m}$                                                                                                                   | 1<br>1               |   |
|    | (b)     |      | $m = -3$<br>$6 = -9 + C$<br>$y = -3x + 15$                                                                                                                 | 1<br>1<br>1          | 3 |
|    | (c)     |      | $x = \text{Fail}$ $y = \text{Buku Nota}$<br><br>$x + y = 84$ @ $3x + 5y = 320$<br><br>$x = 84 - y$ atau setara<br><br>$-2y = -68$<br><br>$y = 34$ $x = 50$ | 1<br><br>1<br>1<br>1 | 4 |
|    | (d)     | (i)  | $\{(77, R)\}$<br>$\frac{1}{6}$<br><br>ATAU<br><br>$\frac{1}{2} \times \frac{1}{3}$<br><br>$\frac{1}{6}$                                                    | 1<br><br>1           |   |
|    |         | (ii) | $\{(77, I), (77, A), (81, R), (81, I), (81, A)\}$<br>$\frac{5}{6}$<br>ATAU<br><br>$1 - \frac{1}{6}$<br>$\frac{5}{6}$<br><br>$\frac{1}{6}$                  | 1<br><br>1           |   |
|    |         |      |                                                                                                                                                            | 15                   |   |

| No | Jawapan |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                               | Markah           |   |
|----|---------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---|
| 17 | (a)     | (i)                                                                                                                                                                                                                                                                                                                                                                                                                                     | <div><p>Melalui semua 8 bucu (mula dari C dan tamat di H)<br/>Pemberat dan terarah betul</p></div>                                                                                                                                                                                          | 1<br>1           | 4 |
|    |         | (ii)                                                                                                                                                                                                                                                                                                                                                                                                                                    | $73 + 78 + 74 + 59 + 68 + 63 + 48$<br>463                                                                                                                                                                                                                                                                                                                                     | 1<br>1           |   |
|    | (b)     | Kecerunan = $\frac{5}{8}$<br>$C = 30$<br>$y = \frac{5}{8}x + 30$                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                               | 1<br><br>1<br>1  | 3 |
|    | (c)     | <u>Kaedah penghapusan</u><br><br>$6x + 4y = 61$ atau $3x + y = 25$<br>$6x = 39$ atau setara<br>Ayam goreng = RM6.50<br>Cendol = RM5.50<br><br>ATAU<br><br><u>Kaedah penggantian</u><br>$6x + 4y = 61$ atau $3x + y = 25$ - 1<br>$y = 25 - 3x$ atau setara                                      - 1<br>Ayam goreng = RM6.50                                      - 1<br>Cendol = RM5.50                                              - 1 |                                                                                                                                                                                                                                                                                                                                                                               | 1<br>1<br>1<br>1 | 4 |
|    | (d)     | (i)                                                                                                                                                                                                                                                                                                                                                                                                                                     | $(50_1, 50_2)$ , $(50_1, 20_1)$ , $(50_1, 20_2)$ , $(50_1, 10)$<br>$(50_2, 50_1)$ , $(50_2, 20_1)$ , $(50_2, 20_2)$ , $(50_2, 10)$<br>$(20_1, 50_1)$ , $(20_1, 50_2)$ , $(20_1, 20_2)$ , $(20_1, 10)$<br>$(20_2, 50_1)$ , $(20_2, 50_2)$ , $(20_2, 20_1)$ , $(20_2, 10)$<br>$(10, 50_1)$ , $(10, 50_2)$ , $(10, 20_1)$ , $(10, 20_2)$<br>Nota :<br>Beri 1 – untuk 2 kesilapan | 2                | 4 |
|    |         | (ii)                                                                                                                                                                                                                                                                                                                                                                                                                                    | $(50_1, 50_2)$ , $(50_2, 50_1)$ , $(20_1, 20_2)$ , $(20_2, 20_1)$<br>$\frac{4}{20} @ \frac{1}{5}$                                                                                                                                                                                                                                                                             | 1<br>1           |   |
|    |         |                                                                                                                                                                                                                                                                                                                                                                                                                                         |                                                                                                                                                                                                                                                                                                                                                                               | 15               |   |