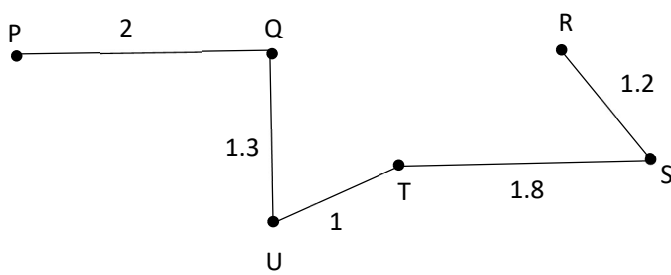
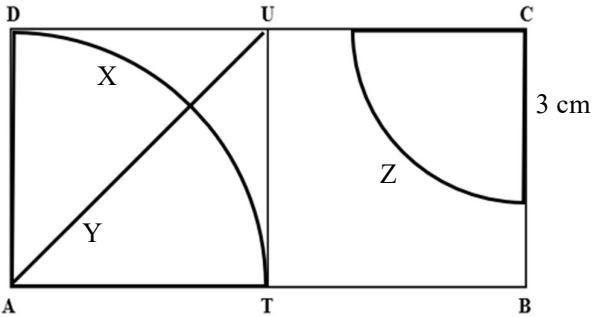
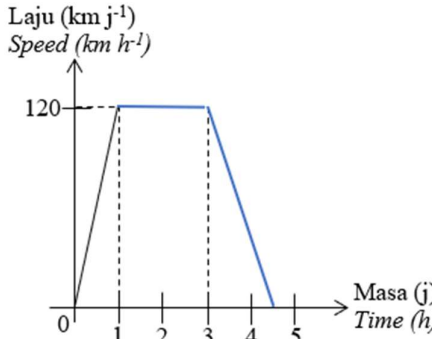
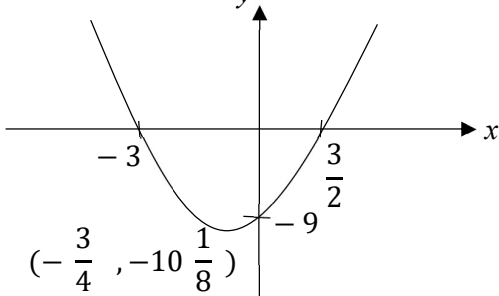


**SKEMA PEPERIKSAAN PERCUBAAN SPM 2022**  
**MATEMATIK KERTAS 2**

| Soalan                | Butiran / Details                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Markah / Marks                                   |                                                           |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------|--------------------------------------------------|-----------------------------------------------------------|-----|-----|------------|------------------|------|-------|-------------|-------|--------|---|
| 1.                    | (a) $\begin{bmatrix} 1 & 1 \\ 1 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 120 \\ -24 \end{bmatrix}$                                                                                                                                                                                                                                                                                                                                   | 1                                                | 5                                                         |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
|                       | (b) $\begin{bmatrix} x \\ y \end{bmatrix} = \frac{1}{1(-2) - (1)(1)} \begin{bmatrix} -2 & -1 \\ -1 & 1 \end{bmatrix} \begin{bmatrix} 120 \\ -24 \end{bmatrix}$                                                                                                                                                                                                                                                                                                        | 1                                                |                                                           |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
|                       | $x = 72$<br>$y = 48$                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1                                                |                                                           |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
| 2.                    | (a) $V = \{P, Q, R, S, T, U\}$<br>$E = \{PQ, PU, QR, QU, QT, RS, RT, ST, TU\}$<br>$\sum d(v) = 18$                                                                                                                                                                                                                                                                                                                                                                    | 1<br>1<br>1                                      | 4                                                         |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
|                       | (b)                                                                                                                                                                                                                                                                                                                                                                                | 1                                                |                                                           |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
| 3.                    | <table border="1" data-bbox="344 1285 1058 1533"> <thead> <tr> <th>Bulan<br/><i>Month</i></th><th>Kerugian<br/><i>Loss</i><br/>(RM)</th><th>Boleh buat tuntutan?<br/><i>Can make a claim?</i></th><th>Bayaran pampasan<br/><i>Amount of compensation</i><br/>(RM)</th></tr> </thead> <tbody> <tr> <td>Mei</td><td>350</td><td>Tidak / No</td><td>Tiada / None / 0</td></tr> <tr> <td>Ogos</td><td>4 800</td><td>Boleh / Can</td><td>4 400</td></tr> </tbody> </table> | Bulan<br><i>Month</i>                            | Kerugian<br><i>Loss</i><br>(RM)                           | Boleh buat tuntutan?<br><i>Can make a claim?</i> | Bayaran pampasan<br><i>Amount of compensation</i><br>(RM) | Mei | 350 | Tidak / No | Tiada / None / 0 | Ogos | 4 800 | Boleh / Can | 4 400 | 2<br>2 | 4 |
| Bulan<br><i>Month</i> | Kerugian<br><i>Loss</i><br>(RM)                                                                                                                                                                                                                                                                                                                                                                                                                                       | Boleh buat tuntutan?<br><i>Can make a claim?</i> | Bayaran pampasan<br><i>Amount of compensation</i><br>(RM) |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
| Mei                   | 350                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Tidak / No                                       | Tiada / None / 0                                          |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
| Ogos                  | 4 800                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Boleh / Can                                      | 4 400                                                     |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
| 4.                    | (a) $90 \times 3$<br>270                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1<br>1                                           | 4                                                         |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |
|                       | (b) $\frac{550}{9}$<br>61.11                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1<br>1                                           |                                                           |                                                  |                                                           |     |     |            |                  |      |       |             |       |        |   |

|    |                                  |                                                                                                                                                                                                                                                                                                                      |             |   |
|----|----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------|---|
| 5. | <p>(a)</p> <p>(b)</p> <p>(b)</p> |  <p>Lokus X dilukis dengan betul./ <i>The X locus is drawn correctly.</i><br/> Lokus Y dilukis dengan betul./ <i>The Y locus is drawn correctly.</i><br/> Lokus Z dilukis dengan betul./ <i>The Z locus is drawn correctly.</i></p> | 1<br>1<br>1 | 3 |
| 6. | (a)                              | $(5\,200 + 900) - (1000 + 1200 + 680 + 300 + 250 + 520)$<br>OR setara<br>2150                                                                                                                                                                                                                                        | 1<br><br>1  | 5 |
|    | (b)                              | $\left(30\,000 \times \frac{3.7}{100} \times 7\right) + 30\,000$ OR setara<br>449.64                                                                                                                                                                                                                                 | 1<br><br>1  |   |
|    | (c)                              | En. Tan mampu bayar ansuran kereta kerana dia mempunyai aliran positif RM2150 OR setara<br><i>Mr. Tan is able to pay the car installment because he has a positive flow of RM2150 OR equivalent</i>                                                                                                                  | 1           |   |
| 7. | (a)                              | $n = 2$<br>$p = 5$                                                                                                                                                                                                                                                                                                   | 1<br>1      | 4 |
|    | (b)                              | $285_{10}$<br>$100\,011\,101_2$                                                                                                                                                                                                                                                                                      | 1<br>1      |   |
| 8. | (a)                              | Benar / <i>True</i>                                                                                                                                                                                                                                                                                                  | 1           | 4 |
|    | (b)                              | Jika $1 \leq A < 10$ dan $n$ ialah integer, maka $A \times 10^n$ satu bentuk piawai.<br><i>If <math>1 \leq A &lt; 10</math> and <math>n</math> is an integer, then <math>A \times 10^n</math> is a standard form.</i>                                                                                                | 1           |   |
|    | (c)                              | (i) Menolak 6 daripada nombor sebelumnya.<br><i>Subtract 6 from the previous number.</i>                                                                                                                                                                                                                             | 1           |   |
|    |                                  | (ii) $4 - 6n, n = 0, 1, 2, 3, \dots$                                                                                                                                                                                                                                                                                 | 1           |   |

|     |     |                                                                                                                                                                                         |                  |   |
|-----|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|---|
| 9.  | (a) |                                                                                                        | 1                | 5 |
|     | (b) | $\frac{1}{2}(4.5+2)(120)$ OR $\frac{1}{2}(1)(120)+\frac{1}{2}(3.5+2)(120)$<br>390                                                                                                       | 1<br>1           |   |
|     | (c) | -80km/h <sup>2</sup><br><br>Kereta nyapecutan pada kadar 80 km/j <sup>2</sup> selama 1 jam terakhir.<br><i>The car decelerates at a rate of 80km/h<sup>2</sup> for the last 1 hour.</i> | 1<br>1           |   |
| 10. |     | $84 = \frac{1}{2}(7)(CE)$<br>$DE = \sqrt{24^2 + 7^2}$<br>$\cos x = \frac{24}{25}$                                                                                                       | 1<br>1<br>1      | 3 |
| 11. | (a) | $2x^2 + 3x - 9$<br><br>$2x^2 + 3x - 9 = 0$<br><br>$(2x - 3)(x + 3) = 0$<br><br>$x = \frac{3}{2}$ atau /or $x = -3$                                                                      | 1<br>1<br>1<br>1 | 8 |
|     | (b) | Titik minimum / <i>minimum point</i><br><br>$(-\frac{3}{4}, -10\frac{1}{8})$                                                                                                            | 1<br>1           |   |
|     | (c) |                                                                                                      | 2                |   |

| 12.                             | (a)                                                                                                             | <table><tr><th>Harga (RM)<br/><i>Price (RM)</i></th><th>Kekerapan<br/><i>Frequency</i></th><th>Titik Tengah<br/><i>Midpoint</i></th></tr><tr><td>20 – 24</td><td>0</td><td>22</td></tr><tr><td>25 - 29</td><td>4</td><td>27</td></tr><tr><td>30 - 34</td><td>6</td><td>32</td></tr><tr><td>35 - 39</td><td>8</td><td>37</td></tr><tr><td>40 - 44</td><td>10</td><td>42</td></tr><tr><td>45 - 49</td><td>7</td><td>47</td></tr><tr><td>50 - 54</td><td>5</td><td>52</td></tr><tr><td>55- 59</td><td>0</td><td>57</td></tr><tr><td>1m</td><td>1m</td><td>1m</td></tr></table> | Harga (RM)<br><i>Price (RM)</i> | Kekerapan<br><i>Frequency</i> | Titik Tengah<br><i>Midpoint</i> | 20 – 24 | 0 | 22 | 25 - 29 | 4 | 27 | 30 - 34 | 6 | 32 | 35 - 39 | 8 | 37 | 40 - 44 | 10 | 42 | 45 - 49 | 7 | 47 | 50 - 54 | 5 | 52 | 55- 59 | 0 | 57 | 1m | 1m | 1m | 3 |
|---------------------------------|-----------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------|-------------------------------|---------------------------------|---------|---|----|---------|---|----|---------|---|----|---------|---|----|---------|----|----|---------|---|----|---------|---|----|--------|---|----|----|----|----|---|
| Harga (RM)<br><i>Price (RM)</i> | Kekerapan<br><i>Frequency</i>                                                                                   | Titik Tengah<br><i>Midpoint</i>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 20 – 24                         | 0                                                                                                               | 22                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 25 - 29                         | 4                                                                                                               | 27                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 30 - 34                         | 6                                                                                                               | 32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 35 - 39                         | 8                                                                                                               | 37                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 40 - 44                         | 10                                                                                                              | 42                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 45 - 49                         | 7                                                                                                               | 47                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 50 - 54                         | 5                                                                                                               | 52                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 55- 59                          | 0                                                                                                               | 57                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| 1m                              | 1m                                                                                                              | 1m                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| (b)                             | $\frac{4 \times 27 + 6 \times 32 + 8 \times 37 + 10 \times 42 + 7 \times 47 + 5 \times 52}{40}$<br><br>RM 40.13 | 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
| (c)                             | <br><br>$\frac{18}{40} \times 100 \% = 45\%$                                                                    | 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                 |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
|                                 |                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 1                               |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |
|                                 |                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 10                              |                               |                                 |         |   |    |         |   |    |         |   |    |         |   |    |         |    |    |         |   |    |         |   |    |        |   |    |    |    |    |   |

|     |            |                                                                                                                                                                                                                                                                                |                       |    |
|-----|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|----|
| 13. | (a)        | $\{(23, B), (23, O), (23, A), (23, T), (35, B), (35, O), (35, A), (35, T), (40, B), (40, O), (40, A), (40, T)\}$                                                                                                                                                               | 1                     | 8  |
|     | (b)        | (i) $\{(23,B), (23,O), (23,A), (23,T), (35,0), (35,A), (40,O), (40,A)\}$<br>$\frac{8}{12}$                                                                                                                                                                                     | 1<br>1                |    |
|     |            | (ii) $\{(23,B), (23,T), (35,B), (35,T)\}$<br>$\frac{4}{12}$                                                                                                                                                                                                                    | 1<br>1                |    |
|     |            | (iii) $\{(23,B), (23,O), (23,A), (23,T), (35,B), (35,0), (35,A), (35,T), (40,B), (40,T)\}$<br>$\frac{10}{12}$                                                                                                                                                                  | 1<br>2                |    |
| 14. | (a)        | 1138<br>1138<br>9104<br>2800<br>474                                                                                                                                                                                                                                            | 1<br>1<br>1<br>1<br>1 | 9  |
|     | (b)        | 474<br><br>Aliran tunai positif. Ali adalah seorang yang bijak menguruskan kewangan. OR <b>terima jawapan yang munasabah.</b><br><i>Positive cash flow. Ali is a wise man who manages finances.</i>                                                                            | 1<br>1                |    |
|     | (c)        | $9104 - (5830 + 1.5 \times 2800) = -926$<br><br>Aliran tunai negatif / <i>Negative cash flow</i>                                                                                                                                                                               | 1<br>1                |    |
| 15. | (a)        | (2, 6)<br><br>*(2, 2) award 1m                                                                                                                                                                                                                                                 | 2                     | 10 |
|     | (b)<br>(i) | (a) $U = \text{Translasi} \begin{pmatrix} 2 \\ -9 \end{pmatrix} / \text{Translation} \begin{pmatrix} 2 \\ -9 \end{pmatrix}$<br><br>(b) $V = \text{Pembesaran dengan faktor skala 2 berpusat di titik A (9, 1)}$<br><i>Enlargement with scale factor of 2 at centre A (9,1)</i> | 2<br>3                |    |
|     | (ii)       | $90 + x$ <b>or</b> $x \times 2^2$<br><br>$90 + x = x \times 2^2$<br><br>$x = 30$                                                                                                                                                                                               | 1<br>1<br>1           |    |

|     |     |                                                                                                                                                                                                                                                                                                                                                                                       |   |    |
|-----|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|
| 16. | (a) | (i)                                                                                                                                                                                                                                                                                                                                                                                   |   |    |
|     |     | $(3x + 5)(4x + 3) - (2x + 1)^2$                                                                                                                                                                                                                                                                                                                                                       | 1 |    |
|     |     | $12x^2 + 29x + 15 - (4x^2 - 4x + 1)$                                                                                                                                                                                                                                                                                                                                                  | 1 |    |
|     |     | $8x^2 + 25x + 14$                                                                                                                                                                                                                                                                                                                                                                     | 1 |    |
|     |     | (ii) 339                                                                                                                                                                                                                                                                                                                                                                              | 1 |    |
|     | (b) | (i) $\frac{10+13+9+15+20}{5}$                                                                                                                                                                                                                                                                                                                                                         | 1 |    |
|     |     | 13.4                                                                                                                                                                                                                                                                                                                                                                                  | 1 |    |
|     |     | (ii) November                                                                                                                                                                                                                                                                                                                                                                         | 1 |    |
|     |     | (iii)<br>Pandan                                                                                                                                                                                                                                                                                                                                                                       |   |    |
|     |     | $\sqrt{\frac{10^2 + 13^2 + 9^2 + 15^2 + 20^2}{5}} - (13.4)^2 = 3.93$                                                                                                                                                                                                                                                                                                                  | 1 |    |
|     |     | Coklat                                                                                                                                                                                                                                                                                                                                                                                |   |    |
|     |     | $\sqrt{\frac{10^2 + 11^2 + 11^2 + 15^2 + 20^2}{5}} - (13.4)^2 = 3.72$                                                                                                                                                                                                                                                                                                                 | 1 |    |
|     |     | Kek coklat yang perlu ditingkatkan hasil pengeluaran kerana sisihan piawai bagi kek coklat lebih rendah berbanding kek pandan kerana penjualan kek coklat adalah lebih konsisten.<br><i>Chocolate cake that needs to be increased in production because the standard deviation of chocolate cake is lower than pandan cake because the sale of chocolate cake is more consistent.</i> | 1 |    |
|     |     | (c)                                                                                                                                                                                                                                                                                                                                                                                   |   |    |
|     |     | (i)                                                                                                                                                                                                                                                                                                                                                                                   |   |    |
|     |     | RM400 + RM110                                                                                                                                                                                                                                                                                                                                                                         | 1 |    |
|     |     | RM510                                                                                                                                                                                                                                                                                                                                                                                 | 1 |    |
|     |     | (ii)                                                                                                                                                                                                                                                                                                                                                                                  |   |    |
|     |     | $(RM32000 - RM20000) \times 3\% = 360$                                                                                                                                                                                                                                                                                                                                                | 1 |    |
|     |     | RM150 + RM360 – RM510                                                                                                                                                                                                                                                                                                                                                                 | 1 |    |
|     |     | RM0                                                                                                                                                                                                                                                                                                                                                                                   | 1 |    |
|     |     |                                                                                                                                                                                                                                                                                                                                                                                       |   | 15 |

|     |     |                                                                                                    |   |    |
|-----|-----|----------------------------------------------------------------------------------------------------|---|----|
| 17. | (a) | (i)                                                                                                |   |    |
|     |     | $L = \frac{1}{2} \times \frac{2}{3}y \times x$                                                     | 1 |    |
|     |     | $\frac{xy}{3}$                                                                                     | 1 |    |
|     |     | (ii)                                                                                               |   |    |
|     |     | $10 = \frac{(3)y}{3}$                                                                              | 1 |    |
|     |     | $y = 10$                                                                                           |   |    |
|     |     |                                                                                                    | 1 |    |
|     | (b) | (i)                                                                                                |   |    |
|     |     | $5 + 3 + 7 + 3p = 3p + 5p$                                                                         | 1 |    |
|     |     | $15 = 5p$                                                                                          | 1 |    |
|     |     | $p = 3$                                                                                            | 1 |    |
|     |     | (ii)                                                                                               |   |    |
|     |     | $5(3) + 3 + 6 + 5 + 7 + 3 + 5 + 3(3)$                                                              | 1 |    |
|     |     | $53 + 7$                                                                                           |   |    |
|     |     | 60                                                                                                 | 1 |    |
|     |     |                                                                                                    | 1 |    |
|     | (c) | (i)                                                                                                |   |    |
|     |     | U = Pantulan pada garis PQ<br><i>U = Reflection at line PQ</i>                                     | 2 |    |
|     |     | V = Putaran 120° ikut arah jam pada pusat R.<br><i>V = Rotation 120° clockwise at the center R</i> | 3 |    |
|     |     |                                                                                                    |   | 15 |