

**MODUL PERKEMBANGAN PEMBELAJARAN
MPP3 TAHUN 2023 TINGKATAN 5**

MATEMATIK TAMBAHAN

3472/2

Kertas 2

PERATURAN PEMARKAHAN

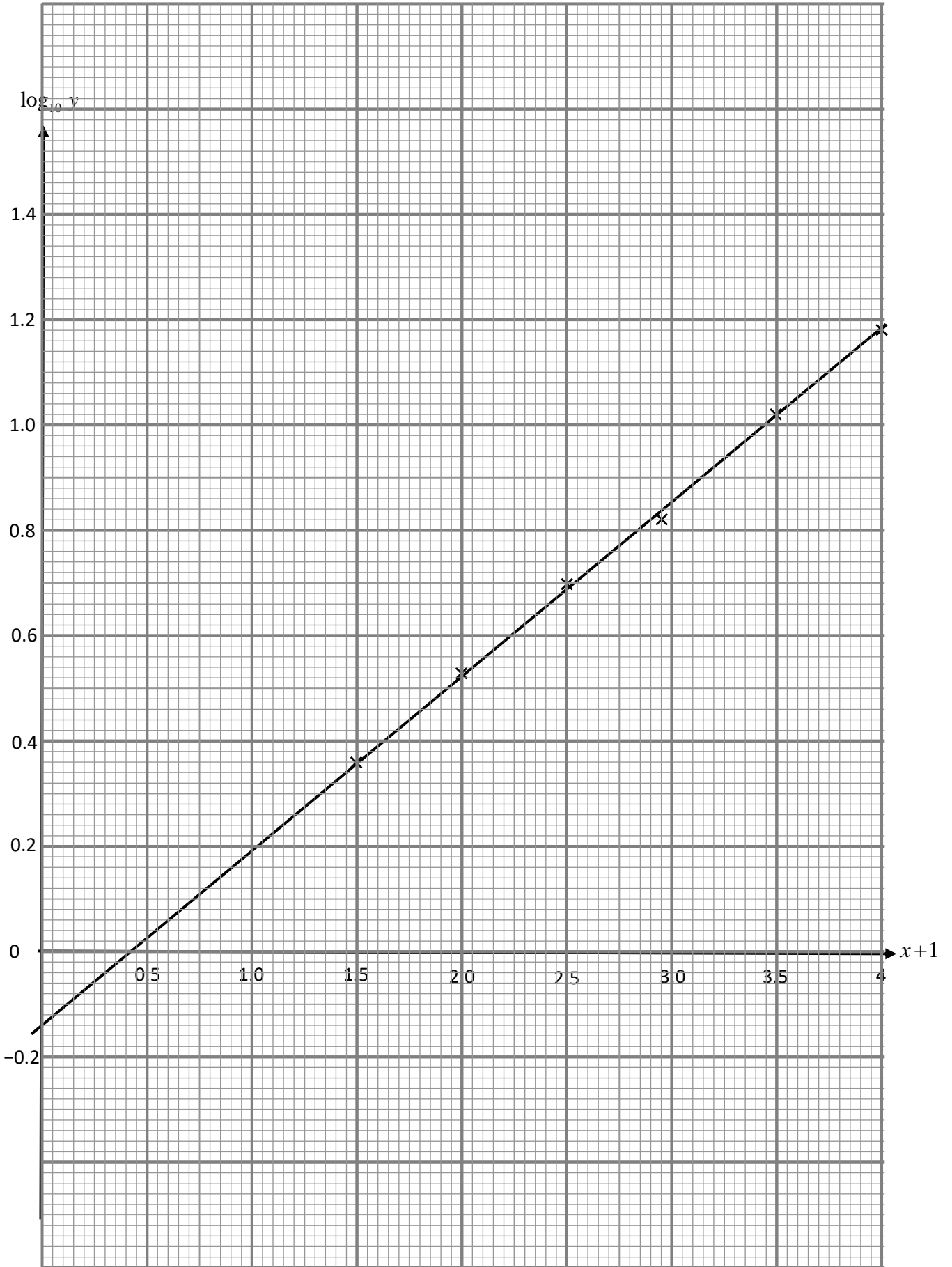
| No | Peraturan Pemarkahan | Jumlah |
|----|---|--------|
| 1 | <p>(a) (i) $gf(x) = 2\left(\frac{x}{p}\right) + 3$ ATAU $f(x) = (2x+3) - 3$ atau setara K1</p> <p>Banding $g^{-1}(x)$ ATAU $f(x)$ atau setara K1</p> <p>$p = 2$ N1</p> <p>(b) (i) $f^2(x) = p(px)$ Ganti $p = 2$ K1</p> <p>$f^2(x) = 4x$ N1</p> <p>(ii) Tulis $f^3(x) = 9x$ atau $f^4(x) = 16x$ K1</p> <p>$f^n(x) = 2^n x$ N1</p> | 7 |
| 2 | <p>${}^m C_2 = 15$ P1</p> <p>$\frac{m!}{(m-2)!2!} = 15$ & Selesaikan $m^2 - m - 30 = 0$</p> <p>ATAU ${}^m C_2 = {}^6 C_2$ K1</p> <p>$m = 6$ N1</p> | 3 |
| 3 | <p>(a) Pendaraban dengan surd konjugat & selesaikan</p> <p>$\frac{7}{3-\sqrt{2}} \times \frac{3+\sqrt{2}}{3+\sqrt{2}}$ dan $\frac{21+7\sqrt{2}}{9-2}$ K1</p> <p>$(\sqrt{a+b\sqrt{2}})^2 = (3+\sqrt{2})^2$ K1</p> <p>$a = 11$ N1</p> <p>$b = 6$ N1</p> <p>(b) $e^{\ln(11)^2} + e^{\ln(6)^2}$ & Selesaikan @ $*(11)^2 + *(6)^2$ K1</p> <p>157 N1</p> | 6 |

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| 4 | <p>(a) (i) $\frac{1 - \cos x}{\sin x}$</p> $= \frac{1 - (1 - 2 \sin^2 \frac{x}{2})}{2 \sin \frac{x}{2} \cos \frac{x}{2}}$ $= \frac{2 \sin^2 \frac{x}{2}}{2 \sin \frac{x}{2} \cos \frac{x}{2}}$ $= \frac{\sin \frac{x}{2}}{\cos \frac{x}{2}}$ $= \tan \frac{x}{2} \quad (LHS = RHS)$ <p>(ii) $\frac{1 - \cos x}{\sin x} + \sin x = 0$ &</p> $1 - \cos x + (1 - \cos^2 x) = 0$ <p>Selesaikan $\cos^2 x + \cos x - 2 = 0$</p> <p>0, 2π</p> | <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>8</p> |
| | <p>(b) $\sqrt{1 - m^2}$ dilihat atau $-\sqrt{1 - m^2}$</p> <p>Guna kos $2A = \cos^2 A - \sin^2 A$ @</p> $\cos 2A = 2 \cos^2 A - 1$ @ $\cos 2A = 1 - 2 \sin^2 A$ <p>&</p> <p>Selesaikan</p> $\sin^2 \frac{\theta}{2} = \frac{1 - \sqrt{1 - m^2}}{2} \quad @ \quad \sin^2 \frac{\theta}{2} = \frac{1 + \sqrt{1 - m^2}}{2}$ | <p>P1</p> <p>K1</p> <p>N1</p> |

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| 5 | <p>(a) $180 = \frac{3}{2}[2a + (3-1)d]$ @ $396 = a + (30-1)d$ K1</p> <p>Selesaikan persamaan serentak K1</p> <p>$d = 12$ & $a = 48$ N1</p> <p>$S_{30} = \frac{30}{2}[2(*48) + (30-1)(*12)]$ K1</p> <p>6660 N1</p> <p>(b) $6660 - \frac{20}{2}[2(*48) + (20-1)(*12)]$ K1</p> <p>3420 N1</p> <p>(c) $T_{29} = *48 + (29-1)(*12)$ K1</p> <p>$\frac{384}{12}$ K1</p> <p>32 N1</p> | 10 |
| 6 | <p>(a) $24^2 = 13^2 + 13^2 - 2(13)(13)\cos\angle BOQ$ @ K1</p> <p>$\sin \frac{\angle BOQ}{2} = \frac{\left(\frac{24}{2}\right)}{13}$ @ setara K1</p> <p>2.352 N1</p> <p>(b) $\tan\left(\frac{*134.76^\circ}{2}\right) = \frac{BR}{13}$ @ $S_{BAQ} = 13(2\pi - *2.352)$ K1</p> <p>$*31.20 + *31.20 + *51.12$ K1</p> <p>113.52 N1</p> <p>(c) $\frac{1}{2}(13)^2 \sin *134.76^\circ$ @ $\frac{1}{2}(13)^2 (*0.79)$ K1</p> <p>$\frac{1}{2}(13)^2 \sin *134.76^\circ + \frac{1}{2}(13)^2 (*0.79)$ @ setara K1</p> <p>126.76 N1</p> | 8 |

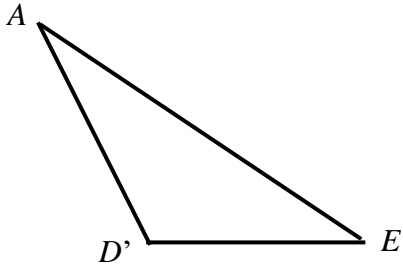
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|---------------|---|-------|------|------|------|------|-----------|---|-----------|---------------|------|------|------|------|------|------|-----------|----|
| 7 | <p>(a) $\vec{OP} = -4\vec{i} + \vec{j}$ (Boleh tersirat) P1</p> <p>Tulis hukum segi tiga bagi ΔPQR P1</p> <p>Panduan: $\vec{OR} = \vec{OP} + \vec{PR}$ @ $\vec{OQ} = \vec{OR} + \vec{RQ}$</p> <p>$-4\vec{i} + \vec{j} + 6\vec{i} + 3\vec{j}$ @ $2\vec{i} + 4\vec{j} + 2\vec{i} - 6\vec{j}$ K1</p> <p>$2\vec{i} + 4\vec{j}$ & $4\vec{i} - 2\vec{j}$ N1</p> <p>$\left(\frac{2+4}{2}, \frac{4+(-2)}{2}\right)$ @ setara K1</p> <p>(3,1) N1</p> <p>(b) $\frac{6\vec{i} + 3\vec{j}}{\sqrt{(6)^2 + (3)^2}}$ K1</p> <p>$\frac{2}{\sqrt{5}}\vec{i} + \frac{1}{\sqrt{5}}\vec{j}$ @ setara N1</p> | 8 | | | | | | | | | | | | | | | | |
| 8 | <p>(a)</p> <table border="1" data-bbox="268 1256 1118 1413"> <tbody> <tr> <td>$x+1$</td> <td>1.5</td> <td>2</td> <td>2.5</td> <td>2.95</td> <td>3.5</td> <td>4</td> <td>N1</td> </tr> <tr> <td>$\log_{10} y$</td> <td>0.36</td> <td>0.53</td> <td>0.70</td> <td>0.82</td> <td>1.02</td> <td>1.18</td> <td>N1</td> </tr> </tbody> </table> <p>Paksi betul dan skala seragam bagi garis lurus K1</p> <p>Semua titik diplot betul N1</p> <p>garis lurus penyuuaian terbaik N1</p> <p>(b) (i) $y = 2.754$ N1</p> <p>(ii) $\log_{10} y = (x+1)\log_{10} p - \log_{10} q$ P1</p> <p>$*0.328 = \log_{10} p$ & $-\log_{10} q = *-0.14$ K1</p> <p>$p = 2.128$ N1</p> <p>$q = 1.380$ N1</p> | $x+1$ | 1.5 | 2 | 2.5 | 2.95 | 3.5 | 4 | N1 | $\log_{10} y$ | 0.36 | 0.53 | 0.70 | 0.82 | 1.02 | 1.18 | N1 | 10 |
| $x+1$ | 1.5 | 2 | 2.5 | 2.95 | 3.5 | 4 | N1 | | | | | | | | | | | |
| $\log_{10} y$ | 0.36 | 0.53 | 0.70 | 0.82 | 1.02 | 1.18 | N1 | | | | | | | | | | | |

No. 8



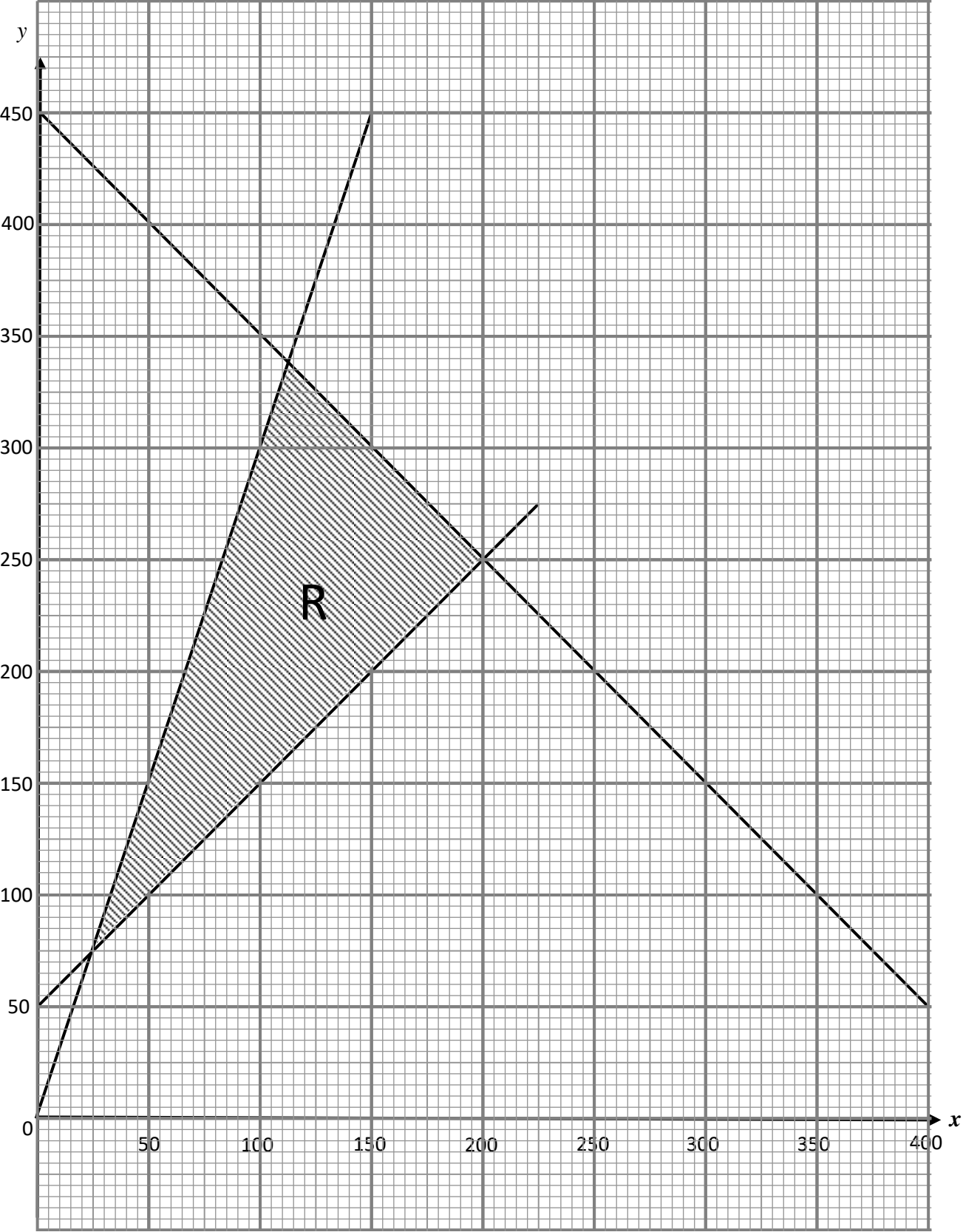
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| 9 | <p>(a) (i) $\frac{2}{3} \times m_1 = -1$ K1</p> <p>$2 = -\frac{3}{2}(0) + c$ & selesaikan @ setara K1</p> <p>ATAU $c = 2$ (DILIHAT) K1</p> <p>$y = -\frac{3}{2}x + 2$ N1</p> <p>(ii) $\frac{2}{3}x + \frac{19}{3} = -\frac{3}{2}x + 2$ & selesaikan K1</p> <p>$B(-2, 5)$ N1</p> <p>(b) $-2 = \frac{(n-m)(0) + m(-5)}{(n-m) + m}$ @ $5 = \frac{(n-m)(2) + m\left(\frac{19}{2}\right)}{(n-m) + m}$ @ K1</p> <p>MENGGUNAKAN FORMULA JARAK DENGAN BETUL K1</p> <p>Selesaikan $-2 = \frac{(n-m)(0) + m(-5)}{(n-m) + m}$ @ $5 = \frac{(n-m)(2) + m\left(\frac{19}{2}\right)}{(n-m) + m}$ @ K1</p> <p>MENCARI NISBAH JARAK YANG SAH K1</p> <p>$m : n = 2 : 5$ N1</p> <p>(c) $\left[\sqrt{[x - (-2)]^2 + (y - 5)^2} = 3 \right]$ K1</p> <p>$x^2 + y^2 + 4x - 10y + 20 = 0$ N1</p> | 10 |
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| 10 | <p>(a) $P(X \geq 1) > 0.9$ P1 $P(X = 0) < 0.1$ P1 ${}^n C_0 \left(\frac{1}{3}\right)^0 \left(\frac{2}{3}\right)^n < 0.1$ K1 $n \log_{10} \frac{2}{3} < \log_{10} 0.1$ & selesaikan K1 $n = 6$ N1</p> <p>(b) $P(X > 50.1) = 0.025$ @ $P(X < 50.1) = 0.975$ @ $P(X > 34.3) = 0.8849$</p> $P\left(Z > \frac{50.1 - \mu}{\sigma}\right) = 0.025$ @ $P\left(Z > \frac{34.3 - \mu}{\sigma}\right) = 0.8849$ K1 $\frac{50.1 - \mu}{\sigma} = 1.96$ @ $\frac{34.3 - \mu}{\sigma} = -1.2$ K1 $\frac{50.1 - \mu}{1.96} = \frac{34.3 - \mu}{1.2}$ K1 $\mu = 40.3$ N1 $\sigma = 5$ N1 | 10 |
| 11 | <p>(a) (i) $3x^2 - 4x$ N1 (ii) $3x^2 - 4x = 0$ & selesaikan K1 $(0, 0)$ dan $\left(\frac{4}{3}, -\frac{32}{27}\right)$ N1 $\frac{d^2y}{dx^2} = 6(*0) - 4 = -4 < 0$ atau $\frac{d^2y}{dx^2} = 6\left(\frac{4}{3}\right) - 4 = 4 > 0$ K1 $(0, 0)$ titik maksimum N1 $\left(\frac{4}{3}, -\frac{32}{27}\right)$ titik minimum N1</p> <p>(b) $\frac{dy}{dx} = 3(2)^2 - 4(2)$ K1 $3x^2 - 4x = 4$ & selesaikan K1 $x = -\frac{2}{3}$ N1 $P\left(-\frac{2}{3}, -\frac{32}{27}\right)$ N1</p> | 10 |

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| 12 | (a) | (i) | $7^2 = 5^2 + 8^2 - 2(5)(8)\cos \angle BDC$ | K1 | 10 |
| | | | 60° | N1 | |
| | | (ii) | $\frac{AD}{\sin 40^\circ} = \frac{12}{\sin 60^\circ}$ | K1 | |
| | | | 8.907 | N1 | |
| | | (iii) | Luas $\triangle ABD = \frac{1}{2} \times 5 \times 8.907 \times \sin 120^\circ$ @ | | |
| | | | Luas $\triangle BDC = \frac{1}{2} \times 8 \times 5 \times \sin 60^\circ$ | K1 | |
| | | 19.284 + 17.321 | K1 | | |
| | | 36.61 | N1 | | |
| | | @ | | | |
| | | Mencari $\angle BCD$ menggunakan Petua Sinus @ Petua Kosinus | K1 | | |
| | | Luas $\triangle ABD = \frac{1}{2} \times 7 \times (8.907 + 8) \times \sin 38.21^\circ$ | K1 | | |
| | | 36.60 | N1 | | |
| | (b) | | | | |
| | |  | N1 | | |
| | | Luas $\triangle AD'E = \frac{1}{2} \times 12 \times 8.907 \times \sin 20^\circ$ | K1 | | |
| | | 18.28 | N1 | | |

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| 13 | <p>(a) $\frac{P_{21}}{3.00} \times 100 = 140$</p> <p>4.20</p> <p>(b) $\frac{140(2p) + 135(3) + 120(1) + 130(p)}{2p + 3 + 1 + p} = 134.5$</p> <p>$p = 2$</p> <p>(c) $\frac{25}{P_{21}} \times 100 = 134.5$</p> <p>18.59</p> <p>(d) $(\bar{I}_{23/15} =) 130 \times \frac{125}{100}$</p> <p>$(\bar{I}_{23/15} =) 162.5$</p> <p>$\left[\frac{140[2 * (2)] + 135(3) + 120(1) + * 162.5 * (2)}{2 * (2) + 3 + 1 + * 2} \right]$</p> <p>141</p> | <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>10</p> |
| 14 | <p>(a) $x + y \leq 450$</p> <p>$y - x \geq 50$</p> <p>$y \leq 3x$</p> <p>(b) Satu *garis lurus dilukis dengan betul</p> <p>Semua *garis lurus dilukis dengan betul</p> <p>Rantau R dilorek</p> <p>(c) (i) $25 \leq x \leq 200$</p> <p>(ii) $x = 125, y = 175$</p> <p>Yuran pengajaran minimum</p> <p>$k = 8000(125) + 12000(175)$</p> <p>RM 3100000</p> | <p>N1</p> <p>N1</p> <p>N1</p> <p>K1</p> <p>K1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>N1</p> <p>K1</p> <p>N1</p> <p>10</p> |

No. 14



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|----|-----|--|-----------|-----------|
| 15 | (a) | Bezakan v_A terhadap t dan samakan dengan 0 | K1 | 10 |
| | | Gantikan $*t$ dalam v_A | K1 | |
| | | $\frac{25}{8}$ | N1 | |
| | (b) | $v_A = 0$ dan selesaikan | K1 | |
| | | Kamirkan V_A terhadap t | K1 | |
| | | Gantikan $t = *2$ ke dalam $*s_A$ | K1 | |
| | | $\frac{14}{3}$ | N1 | |
| | (c) | Kamirkan v_B terhadap t dan tentukan c | K1 | |
| | | $*s_B - *s_A$ $(s_B > s_A)$ | K1 | |
| | | $\frac{34}{3}$ | N1 | |