

PERATURAN PEMARKAHAN PEPERIKSAAN PERCUBAAN SPM 2019

MATEMATIK TAMBAHAN KERTAS 2

NO	PENYELESAIAN / PERATURAN PEMARKAHAN	MARKAH SUB	MARKAH PENUH												
1	<p>(a)</p> <table border="1" data-bbox="406 495 901 882"> <thead> <tr> <th>Length (cm)</th> <th>f</th> </tr> </thead> <tbody> <tr> <td>1 – 5</td> <td>14</td> </tr> <tr> <td>6 – 10</td> <td>10</td> </tr> <tr> <td>11 – 15</td> <td>21</td> </tr> <tr> <td>16 – 20</td> <td>20</td> </tr> <tr> <td>21 – 25</td> <td>15</td> </tr> </tbody> </table> <p>Length</p> <p>Frequency</p> <p>(b)</p> <p>$Q_1 : L = 5.5$ and $F = 14$ and $f = 10$</p> <p>OR</p> <p>$Q_3 : L = 15.5$ and $F = 45$ and $f = 20$</p> <p>$Q_1 = 5.5 + \left(\frac{20 - 14}{10}\right)5$ OR $Q_1 = 15.5 + \left(\frac{60 - 45}{20}\right)5$</p> <p>19.25 – 8.5</p> <p>10.75</p>	Length (cm)	f	1 – 5	14	6 – 10	10	11 – 15	21	16 – 20	20	21 – 25	15	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>6</p>
Length (cm)	f														
1 – 5	14														
6 – 10	10														
11 – 15	21														
16 – 20	20														
21 – 25	15														

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3	<p>(a) $5\pi, 9\pi, 13\pi$ and $d = 4\pi$</p> <p>OR</p> <p>$5, 9, 13$ and $d = 4$</p> <p>$5\pi + (n-1)(4\pi) = 121\pi$ OR $5(n-1)(4) = 121$ $n = 30$</p> <p>(b)</p> <p>$5 + (n-1)(4) = 145$</p> <p>$n = 36$</p> <p>$S_{36} = \frac{36}{2}[2(5\pi) + 35(4\pi)]$</p> <p>$= 2700\pi$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>7</p>
4	<p>$5x + 2y + 50 = 133$</p> <p>$x^2 + y^2 = 25^2$</p> <p>$y = \frac{83-5x}{2}$ OR $x = \frac{83-2y}{5}$</p> <p>$x^2 + \left(\frac{83-5x}{2}\right)^2 = 25^2$ OR $\left(\frac{83-2y}{5}\right)^2 + y^2 = 25^2$</p> <p>$(x-7)(29x-627) = 0$ OR $(y-24)(29y+364) = 0$</p> <p>$x = 7$ and $y = 24$</p> <p>$V = \frac{1}{2}(7 \times 24) \times 7 = 588 \text{ cm}^3$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>7</p>

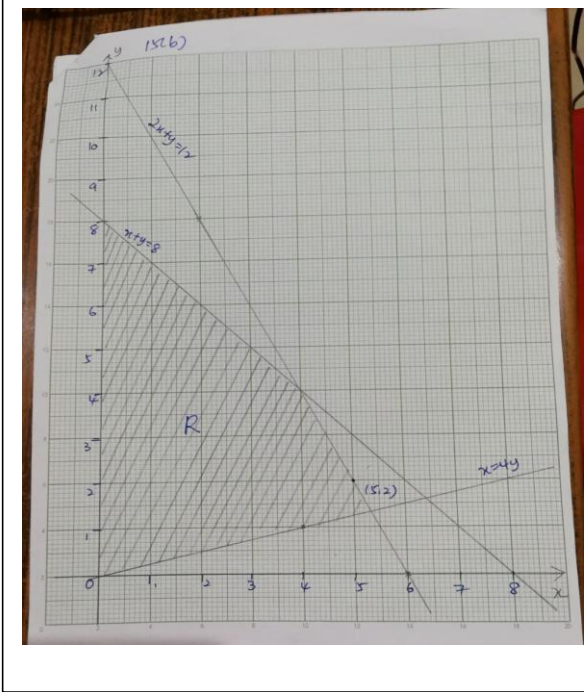
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5	<p>(a) $\alpha + \beta = \frac{3}{2}$ and $\alpha\beta = -3$</p> <p>$\frac{\alpha}{3} + \frac{\beta}{3} = \frac{1}{2}$ OR $\frac{\alpha}{3} \times \frac{\beta}{3} = -\frac{1}{3}$</p> <p>$6x^2 - 3x - 2 = 0$</p> <p>(b) $23 = p(0 - 2)^2 + 3$</p> <p>$p = 5$</p> <p>$h = -2$</p> <p>$k = 3$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>7</p>
6	<p>(a)</p> <p>Use $\log_a mn = \log_a m + \log_a n : \log_a 3^{2x} = \log_a 8 + \log_a 2^{3x}$</p> <p>Use $\log_a m^n = n \log_a m : x \log_a 9 - x \log_a 8 = \log_a 8$</p> <p>$x \log_a 9 - x \log_a 8 = x \log_a \left(\frac{9}{8}\right)$</p> <p>(b)</p> <p>expand $(a^x + a^{-x})^2 = (a^x)^2 + 2 + \left(\frac{1}{a^x}\right)^2$</p> <p>factorise : $(a^x)^2 - 4 = (a^x - 2)(a^x + 2)$</p> <p>(c)</p> <p>$\log_{10} x = 3$</p> <p>$x = 1000$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>7</p>

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7	<p>(a)(i) $P(X=8) + P(X=9) + P(X=10)$</p> ${}^{10}C_8(0.68)^8(0.32)^2 + {}^{10}C_9(0.68)^9(0.32) + {}^{10}C_{10}(0.68)^{10}(0.32)^0$ <p>0.3313</p> <p>(ii) $85(0.32)(0.68)$</p> <p>18.496</p> <p>(b)(i) $\frac{148-155}{15}$ OR $\frac{140-155}{15}$ OR $\frac{150-155}{15}$</p> <p>0.3203</p> <p>(ii) 0.2109</p> <p>0.2109×35</p> <p>7</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>10</p>
8	<p>(a)</p> $\tan \theta = \frac{\sin \theta}{\cos \theta} \quad \text{OR} \quad \cot \theta = \frac{\cos \theta}{\sin \theta} \quad \text{OR} \quad \sec \theta = \frac{1}{\cos \theta}$ <p>OR $\operatorname{cosec} \theta = \frac{1}{\sin \theta}$</p> <p>Seen $\sin^2 \theta + \cos^2 \theta = 1$ and all correct</p> <p>(b) (i) $h = 2$</p> <p>$p = -1$</p> <p>$k = 2$</p> <p>(ii)</p> <p>$y = q$</p> <p>$q > 1$ and $q < -3$</p> <p>(c) $\cos x(3 \sin x + 2) = 0$</p> <p>$x = 90^\circ, 270^\circ$ OR $221.81^\circ, 318.19^\circ$</p> <p>$x = 90^\circ, 270^\circ$ and $221.81^\circ, 318.19^\circ$</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>10</p>

<p>9</p> <p>(a)</p> <p>(b)</p> <p>(c)</p> <p>(i)</p> <p>(ii)</p> <p>(iii)</p>	<table border="1" data-bbox="284 188 1136 362"> <tr> <td>x^2</td> <td>4</td> <td>16</td> <td>36</td> <td>49</td> <td>64</td> <td>81</td> </tr> <tr> <td>$\frac{y}{x}$</td> <td>2.25</td> <td>3.13</td> <td>4.50</td> <td>5.43</td> <td>6.50</td> <td>7.70</td> </tr> </table> $\frac{y}{x} = p + qx^2$ <p>y-intercept = p $p = 2.0$</p> <p>gradient = q $q = 0.07$</p> <p>$y = 18.5$</p>	x^2	4	16	36	49	64	81	$\frac{y}{x}$	2.25	3.13	4.50	5.43	6.50	7.70	<p>N1 all correct</p> <p>N1 all correct</p> <p>K1 Plot $\frac{y}{x}$ vs x^2 correct axes and uniform scales</p> <p>N1 1 point plotted correctly</p> <p>N1 6 points plotted correctly</p> <p>N1 Lines of best fit</p> <p>P1</p> <p>N1</p> <p>N1</p> <p>N1</p>
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10	<p>(a) (i)</p> $t = \frac{128}{r^2}$ $A = 2\pi r^2 + 2\pi r \left(\frac{128}{r^2} \right)$ <p>(ii)</p> $4\pi r - \frac{256\pi}{r^2} = 0$ $A = 2\pi(4)^2 + \frac{256\pi}{4}$ 96π <p>(b) (i) $k = -1$</p> <p>(ii) trapezium $\frac{1}{2}(8+6)(1)$</p> $\left[\frac{x^3}{3} + 7x \right]_{-1}^0 \quad \underline{\text{or equivalent}}$ <p>Subtitute limit 0, -1 into $\left[\frac{x^3}{3} + 7x \right]_{-1}^0 \quad \underline{\text{or equivalent}}$</p> $\frac{1}{3}$	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>10</p>

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14	<p>(a) (i)</p> <div data-bbox="331 344 900 891" style="border: 1px solid black; padding: 10px; margin: 10px 0;"> </div> <p>(ii) $\angle ACB = 51.64^\circ$ $\angle ACB = 128.36^\circ$</p> <p>(b)(i) $\frac{\sin \angle ABD}{12} = \frac{\sin 50^\circ}{10}$ $\angle ABD = 113.18^\circ$</p> <p>(ii) $CD^2 = 10^2 + 8.5^2 - 2(10)(8.5)\cos 66.82^\circ$ $CD = 10.26$</p> <p>(iii) $\frac{1}{2}(10)(8.5)\sin 66.82^\circ + \frac{1}{2}(10)(12)\sin 16.82^\circ$ Or equivalent 56.43</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>10</p>

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15	<p>(a) I: $x + y \leq 8$</p> <p>II: $x \leq 4y$</p> <p>III: $2x + y \leq 12$</p> <p>(b)</p>  <p>1 line plotted correctly</p> <p>3 lines plotted correctly</p> <p>Correct shaded region R</p> <p>(c) (i) $y = 1$</p> <p>(ii) $(5,2)$</p> <p>$28(5) + 9(2)$</p> <p>158</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>1</p>	<p>10</p>