







Question number	Scheme	Marks
6.	<p>(a) <math>t = 15 \quad 25 \quad 30</math>  <math>v = \underline{3.80 \quad 9.72 \quad 15.37}</math></p> <p>(b) <math>S \approx \frac{1}{2} \times 5; [0 + 15.37 + 2(1.22 + 2.28 + 3.80 + 6.11 + 9.72)]</math>  <math>= \frac{5}{2}[61.63] = 154.075 = \text{AWRT } \underline{154}</math></p>	<p>B1 B1 B1 (3)</p> <p>B1 [M1]</p> <p>A1 (3)</p> <p><b>Total 6 marks</b></p>

7.	<p>(a) <math>\frac{dy}{dx} = 6x^2 - 10x - 4</math></p> <p>(b) <math>6x^2 - 10x - 4 = 0</math>  <math>2(3x + 1)(x - 2) [=0]</math>  <math>\underline{x = 2 \text{ or } -\frac{1}{3}}</math> (both x values)</p> <p>Points are <math>(2, \underline{-10})</math> and <math>(-\frac{1}{3}, \underline{2\frac{19}{27}} \text{ or } \frac{73}{27} \text{ or } 2.70 \text{ or better})</math> (both y values)</p> <p>(c) <math>\frac{d^2y}{dx^2} = 12x - 10</math></p> <p>(d) <math>x = 2 \Rightarrow \frac{d^2y}{dx^2} (=14) \geq 0 \therefore [(2, -10)]</math> is a <u>Min</u></p> <p><math>x = -\frac{1}{3} \Rightarrow \frac{d^2y}{dx^2} (= -14) \leq 0 \therefore [(-\frac{1}{3}, \frac{73}{27})]</math> is a <u>Max</u></p>	<p>M1 A1 (2)</p> <p>M1</p> <p>M1</p> <p>A1</p> <p>A1 (4)</p> <p>M1 A1 (2)</p> <p>M1</p> <p>A1 (2)</p> <p><b>Total 10 marks</b></p>
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Question number	Scheme	Marks
8.	(a) $\sin(\theta + 30) = \frac{3}{5}$ $\theta + 30 = 36.9$ or $\theta = 143.1$ $\theta = \underline{6.9, 113.1}$	( $\frac{3}{5}$ on RHS) B1 ( $\alpha = \text{AWRT } 37$ ) B1 ( $180 - \alpha$ ) M1 A1cao (4)
	(b) $\tan \theta = \pm 2$ or $\sin \theta = \pm \frac{2}{\sqrt{5}}$ or $\cos \theta = \pm \frac{1}{\sqrt{5}}$ ( $\tan \theta = 2 \Rightarrow$ ) $\theta = \underline{63.4}$ ( $\beta = \text{AWRT } 63.4$ ) B1 or $\theta = \underline{243.4}$ ( $180 + \beta$ ) M1 ( $\tan \theta = -2 \Rightarrow$ ) $\theta = \underline{116.6}$ ( $180 - \beta$ ) M1 or $\theta = \underline{296.6}$ ( $180 + \text{their } 116.6$ ) M1 (5)	B1 B1 M1 M1 M1 (5)
		<b>Total 9 marks</b>

Question number	Scheme	Marks
9.	<p>(a) <math>\frac{3}{2} = -2x^2 + 4x</math></p> <p><math>4x^2 - 8x + 3 (= 0)</math></p> <p><math>(2x - 1)(2x - 3) = 0</math></p> <p style="text-align: center;"><u><math>x = \frac{1}{2}, \frac{3}{2}</math></u></p> <p>(b) Area of <math>R = \int_{\frac{1}{2}}^{\frac{3}{2}} (-2x^2 + 4x) dx - \frac{3}{2}</math> (for <math>-\frac{3}{2}</math>)</p> <p><math>\int (-2x^2 + 4x) dx = \left[ -\frac{2}{3}x^3 + 2x^2 \right]</math> (Allow <math>\pm[ ]</math>, accept <math>\frac{4}{2}x^2</math>)</p> <p><math>\int_{\frac{1}{2}}^{\frac{3}{2}} (-2x^2 + 4x) dx = \left( -\frac{2}{3} \times \frac{3^3}{2^3} + 2 \times \frac{3^2}{2^2} \right) - \left( -\frac{2}{3} \times \frac{1}{2^3} + 2 \times \frac{1}{2^2} \right)</math></p> <p style="text-align: center;"><math>\left( = \frac{11}{6} \right)</math></p> <p>Area of <math>R = \frac{11}{6} - \frac{3}{2} = \frac{1}{3}</math> (Accept exact equivalent but not 0.33...)</p>	<p>M1</p> <p>A1</p> <p>M1</p> <p>A1 (4)</p> <p>B1</p> <p>M1 [A1]</p> <p>M1 M1</p> <p>A1cao (6)</p> <p><b>Total 10 marks</b></p>