

C2	Answers to the Calculator Paper																																											
1	<p>Mark 1 Know how to find a percentage increase $100 + 4.5 = 104.5\% = 1.045$</p> <p>Mark 2 Use this answer to find value over three years 14000×1.045^4 or $\left(\frac{104.5}{100}\right)^4$</p> <p>Mark 3 Calculate the answer rounded to the nearest penny. £16695.26</p> <p>Full marks will be given for finding percentage increase each year for 4 years. <i>Year 1</i> £14000 $\times 1.045 = 14630$. <i>Year 2</i> £15288.35. <i>Year 3</i> £15976.33. <i>Year 4</i> £16695.26</p> <p>2 marks will be given for a percentage decrease $14000 \times 0.955^4 = £11645.05$ No marks will be given for adding 4 lots of 4.5% $\rightarrow 14000 + 4 \times 630 = £16520$</p>																																											
2	<p>Mark 1 Appropriate fraction $\frac{54}{360}$ or equivalent</p> <p>Mark 2 Substitution into area formula $\frac{54}{360} \times \pi \times 2 \times 7.3$</p> <p>Mark 3 Calculate the length of arc PR 6.88 cm</p> <p>2 marks will be given for finding the area of the sector $\frac{54}{360} \times \pi \times 7.3^2 = 25.11 \text{ cm}^2$</p>																																											
3	<p>Mark 1 Substitute into the formula $\frac{CB}{\sin 125} = \frac{12}{\sin 30}$</p> <p>Mark 2 rearrange sine rule $AC = \frac{12 \times \sin 125}{\sin 30}$</p> <p>Mark 3 Calculate side AC AC = 19.66 cm</p>																																											
4	<p>Mark 1 Find the mean $\bar{x} = \frac{1020}{6} = 170$</p> <p>Mark 2 Complete the table of values for either formula</p> <table><tr><th>x</th><th>$x - \bar{x}$</th><th>$(x - \bar{x})^2$</th></tr><tr><td>170</td><td>0</td><td>0</td></tr><tr><td>169</td><td>-1</td><td>1</td></tr><tr><td>164</td><td>-6</td><td>36</td></tr><tr><td>172</td><td>2</td><td>4</td></tr><tr><td>178</td><td>8</td><td>64</td></tr><tr><td>167</td><td>-3</td><td>9</td></tr><tr><td>$\sum x$ = 1020</td><td>$\sum (x - \bar{x})$ = 0</td><td>$\sum (x - \bar{x})^2$ = 138</td></tr></table> <table><tr><th>x</th><th>x^2</th></tr><tr><td>170</td><td>28900</td></tr><tr><td>169</td><td>28561</td></tr><tr><td>164</td><td>26896</td></tr><tr><td>172</td><td>29584</td></tr><tr><td>178</td><td>31684</td></tr><tr><td>167</td><td>27889</td></tr><tr><td>$\sum x$ = 1020</td><td>$\sum x^2$ = 173514</td></tr></table> <p>Mark 3 Substitute into the formulae $s = \sqrt{\frac{114}{5}}$ $s = \sqrt{\frac{173514 - \frac{1020^2}{6}}{5}}$</p> <p>Mark 4 Calculate the standard deviation s = 4.77</p>		x	$x - \bar{x}$	$(x - \bar{x})^2$	170	0	0	169	-1	1	164	-6	36	172	2	4	178	8	64	167	-3	9	$\sum x$ = 1020	$\sum (x - \bar{x})$ = 0	$\sum (x - \bar{x})^2$ = 138	x	x^2	170	28900	169	28561	164	26896	172	29584	178	31684	167	27889	$\sum x$ = 1020	$\sum x^2$ = 173514		
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5	<p>Mark 1 correct substitution into the quadratic formula $x = \frac{-3 \pm \sqrt{3^2 - 4 \times 2 \times (-1)}}{2 \times 2}$</p> <p>Mark 2 evaluate discriminant $b^2 - 4ac = 17$</p> <p>Mark 3 calculate both roots correct to one decimal place $x = \mathbf{0.3 \text{ and } -1.8}$</p>	
6	<p>Mark 1 Know that $\triangle POS$ and $\triangle SOQ$ are isosceles and $\angle PSQ$ and $\angle OSR$ are right-angles.</p> <p>Mark 2 Use these properties to find angles $\angle QSR$ and $\angle SQR$</p> <p>Mark 3 Find angle QRS</p> $\begin{aligned}\angle OPS &= \angle OPS = 28^\circ, \\ \angle OSQ &= \angle OQS = 90^\circ - 28^\circ = 62^\circ, \\ \angle QSR &= 90^\circ - 62^\circ = 28^\circ \\ \angle SQR &= 180^\circ - 62^\circ = 118^\circ \\ \angle QRS &= 180^\circ - 28^\circ - 118^\circ = \mathbf{34^\circ}\end{aligned}$ <p>There are other ways to calculate this angle.</p>	
7	<p>Mark 1 Substitute into the cosine rule $\cos B = \frac{2.7^2 + 4.2^2 - 5.9^2}{2 \times 2.7 \times 4.2}$</p> <p>Mark 2 find the exact value for $\cos B$ $\cos B = -\frac{247}{567}, -0.4356 \dots$</p> <p>Mark 3 angle B $\mathbf{115.8^\circ}$</p> <p>2 marks will be given for angle $A = 39.8^\circ$ or angle $C = 24.3^\circ$ as long as correct working is shown</p>	
8	<p>Mark 1 rearrange the equation $\sin x = -\frac{3}{5}$</p> <p>Mark 2 find the first solution $x = \mathbf{217^\circ}$</p> <p>Mark 3 find the second solution $x = \mathbf{323^\circ}$</p> <p>For an answer of $\sin x = -\frac{3}{5}$, $x = 37^\circ, 217^\circ$ (or 323°) then two marks can be given</p> <p>For an answer of $\sin x = \frac{3}{5}$, $x = 37^\circ, 143^\circ$ only the first mark is given as the calculation has been eased.</p>	
9	<p>Mark 1 substitute into the formula for a cylinder $V = \pi \times 5^2 \times 4$</p> <p>Mark 2 calculate the volume $V = 314(.159)cm^3$</p> <p>Mark 3 Use answer to form an equation $314 = \frac{2}{3} \times \pi \times r^3$</p> <p>Mark 4 Start to rearrange the equation $\frac{314 \times 3}{2\pi} = r^3$</p> <p>Mark 5 Find radius $r = \sqrt[3]{\frac{942}{2\pi}} = \mathbf{5.3 \text{ cm.}}$</p>	
30 marks		