

**Paper C Calculator Solutions**

Qu	Marking Guidance	Illustration
1.	<ul style="list-style-type: none"> <li>• Correct Multiplier</li> <li>• Calculation</li> <li>• Final</li> </ul>	<ul style="list-style-type: none"> <li>• 0.96</li> <li>• <math>495 \times 0.96^5</math></li> <li>• £403.61</li> </ul>
2.	<ul style="list-style-type: none"> <li>• Begins to solve</li> <li>• Continues</li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>6x + 3 = 20</math></li> <li>• <math>6x = 17</math></li> <li>• <math>x = \frac{17}{6}</math></li> </ul>
3.	<ul style="list-style-type: none"> <li>• Correct components</li> <li>• Begins to find magnitude</li> <li>• Magnitude</li> </ul>	<ul style="list-style-type: none"> <li>• <math>\begin{pmatrix} 6 \\ 9 \\ -15 \end{pmatrix}</math></li> <li>• <math>\sqrt{6^2 + 9^2} = (-15)^2</math></li> <li>• 18.49</li> </ul>
4.	<ul style="list-style-type: none"> <li>• Expands one set of brackets</li> <li>• Expands second set of brackets</li> </ul>	<ul style="list-style-type: none"> <li>• <math>(4x^2 - 1)(2x - 1)</math></li> <li>• <math>8x^3 - 4x^2 - 2x + 1</math></li> </ul>
5.	<ul style="list-style-type: none"> <li>• Correct factors or Correct Signs</li> <li>• Correct factors AND Correct signs</li> </ul>	<ul style="list-style-type: none"> <li>• <math>(2x \dots 3)(x \dots 4)</math></li> <li>• <math>(2x + 3)(x - 4)</math></li> </ul>
6.	<ul style="list-style-type: none"> <li>• Begins to solve</li> <li>• Continues to solve</li> <li>• Final solution with correct inequality</li> </ul>	<ul style="list-style-type: none"> <li>• <math>3x + 15 \leq 4x - 20</math></li> <li>• <math>-x \leq -35</math></li> <li>• <math>x \geq 35</math></li> </ul>
7.	<ul style="list-style-type: none"> <li>• Correct Mean</li> </ul>	<ul style="list-style-type: none"> <li>• 61</li> </ul>
	<ul style="list-style-type: none"> <li>• <math>(x - \bar{x})^2</math></li> <li>• Begins to find standard deviation</li> <li>• Calculates standard deviation</li> </ul>	<ul style="list-style-type: none"> <li>• 484, 100, 100, 484, 0</li> <li>• <math>\sqrt{\frac{1169}{4}}</math></li> <li>• 17.09</li> </ul>
	<ul style="list-style-type: none"> <li>• Valid statement comparing mean</li> <li>• Valid statement comparing standard deviation</li> </ul>	<ul style="list-style-type: none"> <li>• Sample 1 was less consistent than sample 2 as it has a higher standard deviation</li> <li>• Sample 2, on average, has higher test scores than sample 1 as the mean was greater.</li> </ul>
8.	<ul style="list-style-type: none"> <li>• Correctly applies the formula</li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>\frac{1}{2} \times 18 \times 22 \times \sin 35</math></li> <li>• <math>113.57 \text{ cm}^2</math></li> </ul>
9.	<ul style="list-style-type: none"> <li>• Correct arc length</li> </ul>	<ul style="list-style-type: none"> <li>• <math>10 \text{ cm}</math></li> </ul>
	<ul style="list-style-type: none"> <li>• Knows how to find the angle</li> <li>• Begins to find the angle</li> <li>• Final angle proof</li> </ul>	<ul style="list-style-type: none"> <li>• <math>10 = \frac{x}{360} \times \pi \times 14</math></li> <li>• <math>x = \frac{10 \times 360}{14 \times \pi}</math></li> <li>• <math>x = 81.9^0</math> as required</li> </ul>
	<ul style="list-style-type: none"> <li>• Correct fraction</li> <li>• Correct calculation</li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>\frac{81.9}{360}</math></li> <li>• <math>A = \frac{81.9}{360} \times \pi \times 7^2</math></li> <li>• <math>A = 35 \text{ cm}^2</math></li> </ul>
10.	<ul style="list-style-type: none"> <li>• Rearranges for <math>\sin x</math></li> <li>• Finds related angle</li> <li>• Correct angles</li> </ul>	<ul style="list-style-type: none"> <li>• <math>\sin x = -\frac{1}{3}</math></li> <li>• <math>x = 19.47^0</math></li> <li>• <math>x_1 = 199.47^0</math> and <math>x_2 = 340.53^0</math></li> </ul>
11.	<ul style="list-style-type: none"> <li>• Finds <math>\angle OBD</math></li> <li>• Finds <math>\angle FBE</math></li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>\angle OBD = 60^0</math></li> <li>• <math>\angle FBE = 50^0</math></li> <li>• <math>\angle FBD = 110^0</math></li> </ul>
12.	<ul style="list-style-type: none"> <li>• Correctly applies the formula for cone</li> <li>• Correctly applies the formula for sphere</li> <li>• Volume of cone and sphere</li> <li>• Final statement</li> </ul>	<ul style="list-style-type: none"> <li>• <math>V_{\text{cone}} = \frac{1}{3} \pi \times 3.5^2 \times 10</math></li> <li>• <math>V_{\text{sph}} = \frac{4}{3} \pi \times 3.2^3</math></li> <li>• <math>V_{\text{cone}} = 128.28 \text{ cm}^3</math>, <math>V_{\text{sph}} = 137.36 \text{ cm}^3</math></li> <li>• The sphere has a greater volume than the cone.</li> </ul>

13.	<ul style="list-style-type: none"> <li>• Correctly applies quadratic formula</li> <li>• Simplifies quadratic formula</li> <li>• First solution</li> <li>• Second solution</li> </ul>	<ul style="list-style-type: none"> <li>• <math>x = \frac{8 \pm \sqrt{(-8)^2 - 4 \times 2 \times 3}}{2 \times 2}</math></li> <li>• <math>x = \frac{8 \pm \sqrt{40}}{4}</math></li> <li>• <math>x_1 = 3.58</math></li> <li>• <math>x_2 = 0.42</math></li> </ul>
14.	<ul style="list-style-type: none"> <li>• Common denominator</li> <li>• Writes as a single fraction</li> <li>• Simplifies numerator</li> </ul>	<ul style="list-style-type: none"> <li>• <math>\frac{2x}{x(x-5)} - \frac{4(x-5)}{x(x-5)}</math></li> <li>• <math>\frac{2x-4x+20}{x(x-5)}</math></li> <li>• <math>\frac{20-2x}{x(x-5)}</math></li> </ul>
15.	<ul style="list-style-type: none"> <li>• Correct angle</li> <li>• Applies cosine rule</li> <li>• Simplifies</li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>130^0</math></li> <li>• <math>x^2 = 360^2 + 120^2 - 2 \times 360 \times 120 \times \cos 130</math></li> <li>• <math>x^2 = 199536.85</math></li> <li>• <math>x^2 = 446.7km</math></li> </ul>
16.	<ul style="list-style-type: none"> <li>• Plus 5</li> <li>• Divide by 3</li> <li>• Cube root</li> </ul>	<ul style="list-style-type: none"> <li>• <math>3x^3 = y + 5</math></li> <li>• <math>x^3 = \frac{y+5}{3}</math></li> <li>• <math>x = \sqrt[3]{\frac{y+5}{3}}</math></li> </ul>
17.	<ul style="list-style-type: none"> <li>• Correctly applies discriminant</li> <li>• Simplifies and equates to zero</li> <li>• Factorises</li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>(-p)^2 - 4 \times 3 \times (p - 3)</math></li> <li>• <math>p^2 - 12p + 36 = 0</math></li> <li>• <math>(p + 6)(p + 6) = 0</math></li> <li>• <math>p = -6</math></li> </ul>