

Paper D Calculator Solutions

Qu	Marking Guidance	Illustration
1.	<ul style="list-style-type: none"> <li>Correctly finds first year</li> <li>Finds second year</li> <li>Correct rounding</li> </ul>	<ul style="list-style-type: none"> <li><math>350 \times 1.1 = 385</math></li> <li><math>3.85 \times 1.12^2 = \text{£}482.94</math></li> <li><math>\text{£}480</math></li> </ul>
2.	<ul style="list-style-type: none"> <li>Correctly rearranges to <math>y = mx + c</math></li> <li>Gradient</li> <li>y-intercept.</li> </ul>	<ul style="list-style-type: none"> <li><math>y = \frac{3}{4}x - 3</math></li> <li><math>m = \frac{3}{4}</math></li> <li><math>(0, -3)</math></li> </ul>
	<ul style="list-style-type: none"> <li>Correct answer</li> </ul>	<ul style="list-style-type: none"> <li><math>(4, 0)</math></li> </ul>
3.	<ul style="list-style-type: none"> <li>Simplifies numerator</li> <li>Final answer</li> </ul>	<ul style="list-style-type: none"> <li><math>\frac{32x^{-6}}{19x^4}</math></li> <li><math>\frac{32}{9x^{10}}</math></li> </ul>
4.	<ul style="list-style-type: none"> <li>Correct substitution</li> <li>Final answer</li> </ul>	<ul style="list-style-type: none"> <li><math>f(5) = \frac{7}{5} + 5</math></li> <li><math>f(5) = \frac{32}{5}</math></li> </ul>
5.	<ul style="list-style-type: none"> <li>Establishes <math>x, y, z</math> displacement</li> <li>Begins to find lengths</li> <li>Correct Answer</li> </ul>	<ul style="list-style-type: none"> <li><math>x = -3, y = -2, z = -2</math></li> <li><math>\sqrt{(-3)^2 + (-2)^2 + (-2)^2}</math></li> <li><math>4.12 \text{ units}</math></li> </ul>
6.	<ul style="list-style-type: none"> <li>Correct answer</li> </ul>	<ul style="list-style-type: none"> <li><math>3a + 4f = 6.54</math></li> </ul>
	<ul style="list-style-type: none"> <li>Correct answer</li> </ul>	<ul style="list-style-type: none"> <li><math>2a + 5f = 7.23</math></li> </ul>
	<ul style="list-style-type: none"> <li>Begins to solve equations</li> <li>Price of a flapjack</li> <li>Price of apple</li> </ul>	<ul style="list-style-type: none"> <li><math>6a + 8f = 13.08</math></li> <li><math>-6a - 15f = -21.69</math></li> <li>Flapjack = <math>\text{£}1.23</math></li> <li>Apple = <math>\text{£}0.54</math></li> </ul>
7.	<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{140}{360}</math></li> <li><math>\frac{140}{360} \times \pi \times 15.2</math></li> <li><math>18.57m</math></li> </ul>
8.	<ul style="list-style-type: none"> <li>Correct answer</li> </ul>	<ul style="list-style-type: none"> <li><math>(0, 8)</math></li> </ul>
	<ul style="list-style-type: none"> <li>Correct Factors OR Correct signs</li> <li>Correct factors AND signs equal to zero</li> <li>Final answer</li> </ul>	<ul style="list-style-type: none"> <li><math>(x \dots 4)(x \dots 2) = 0</math></li> <li><math>(x - 4)(x - 2) = 0</math></li> <li><math>x = 4</math> and <math>x = 2</math></li> </ul>
	<ul style="list-style-type: none"> <li>Correct answer</li> </ul>	<ul style="list-style-type: none"> <li><math>x = 3</math></li> </ul>
	<ul style="list-style-type: none"> <li>Correct turning point</li> <li>Correct annotation</li> </ul>	<ul style="list-style-type: none"> <li><math>TP = (3, -1)</math></li> <li>Roots <math>(2, 0)</math> and <math>(4, 0)</math> sketched</li> </ul>
9.	<ul style="list-style-type: none"> <li>Correct application of formula</li> <li>Final answer</li> </ul>	<ul style="list-style-type: none"> <li><math>V = \frac{1}{3} \times 7 \times 8 \times 12</math></li> <li><math>V = 224cm^3</math></li> </ul>
10.	<ul style="list-style-type: none"> <li>Uses correct integers for Pythagoras</li> <li>Begins to use Pythagoras</li> <li>Correct missing length</li> <li>Final answer</li> </ul>	<ul style="list-style-type: none"> <li><math>y^2 = 7^2 - 4^2</math></li> <li><math>y^2 = 33</math></li> <li><math>y = 5.7</math></li> <li><math>x = 11.49</math></li> </ul>
11.	<ul style="list-style-type: none"> <li>Correctly subs into quadratic formula</li> <li>Begins to solve quadratic formulae</li> <li>Solution 1</li> <li>Solution 2</li> </ul>	<ul style="list-style-type: none"> <li><math>x = \frac{-6 \pm \sqrt{6^2 - 4 \times 2 \times 1}}{2 \times 2}</math></li> <li><math>x = \frac{-6 \pm \sqrt{28}}{2 \times 2}</math></li> <li><math>x = -0.18</math></li> <li><math>x = -2.8</math></li> </ul>
12.	<ul style="list-style-type: none"> <li>Correct linear scale factor</li> <li>Correct equation</li> <li>Solves for <math>x</math></li> </ul>	<ul style="list-style-type: none"> <li><math>SF_{Linear} = \frac{3}{2}</math></li> <li><math>\frac{3}{2}x = x + 7</math></li> <li><math>x = 14cm</math></li> </ul>
13.	<ul style="list-style-type: none"> <li>Rearranges for <math>\sin x</math></li> <li>Finds related angle</li> <li>Correct angles from quadrants</li> </ul>	<ul style="list-style-type: none"> <li><math>\sin x = \frac{1}{2}</math></li> <li><math>x = 30^0</math></li> <li><math>x_1 = 210^0, x_2 = 330^0</math></li> </ul>

14	<ul style="list-style-type: none"> <li>• Correctly applies right angle trigonometry</li> <li>• Finds missing angle</li> <li>• Correctly applies sine rule</li> <li>• Begins to solve for <math>x</math></li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>\cos^{-1}\left(\frac{10}{14}\right)</math></li> <li>• <math>44.4^{\circ}</math></li> <li>• <math>\frac{x}{\sin 135.6} = \frac{14}{\sin 22}</math></li> <li>• <math>x = \frac{14 \times \sin 135.6}{\sin 22}</math></li> <li>• <math>x = 26.16\text{cm}</math></li> </ul>
15.	<ul style="list-style-type: none"> <li>• Correctly applies formula</li> <li>• Begins to solve for <math>x</math></li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>50.6 = \frac{1}{2} \times 12 \times 20 \times \sin x</math></li> <li>• <math>\sin x = \frac{50.6}{120}</math></li> <li>• <math>x = 24.9^{\circ}</math></li> </ul>
16.	<ul style="list-style-type: none"> <li>• Correct answer</li> </ul>	<ul style="list-style-type: none"> <li>• 8.5</li> </ul>
	<ul style="list-style-type: none"> <li>• Correct lower quartile</li> <li>• Correct upper quartile</li> </ul>	<ul style="list-style-type: none"> <li>• <math>Q_1 = 7</math></li> <li>• <math>Q_2 = 10</math></li> </ul>
	<ul style="list-style-type: none"> <li>• Correct SIQR</li> </ul>	<ul style="list-style-type: none"> <li>• <math>SIQR = 1.5</math></li> </ul>
	<ul style="list-style-type: none"> <li>• Valid statement comparing median and average</li> <li>• Valid statement comparing SIQR with consistency</li> </ul>	<ul style="list-style-type: none"> <li>• On average the first set was faster than the second set as the first median is greater than the second median.</li> <li>• The first set was more consistent than the second set as it has a small standard deviation.</li> </ul>
17.	<ul style="list-style-type: none"> <li>• Correct difference</li> <li>• Correct calculation</li> <li>• Final answer</li> </ul>	<ul style="list-style-type: none"> <li>• 18000</li> <li>• <math>\frac{18000}{230000} \times 100</math></li> <li>• 7.8%</li> </ul>
18.	<ul style="list-style-type: none"> <li>• Correct Answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>a</math></li> </ul>
	<ul style="list-style-type: none"> <li>• Correct Answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>b + \frac{1}{2}a</math></li> </ul>
	<ul style="list-style-type: none"> <li>• Correct Answer</li> </ul>	<ul style="list-style-type: none"> <li>• <math>b + \frac{3}{2}a</math></li> </ul>