

Paper B Calculator Solutions

| Qu | Marking Guidance | Illustration |
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| 1. | <ul style="list-style-type: none"> Begins to solve Continues to solve Final solution | <ul style="list-style-type: none"> $6x - 2 = 30$ $6x = 32$ $x = \frac{16}{3}$ |
| 2. | <ul style="list-style-type: none"> Value of p Value of q | <ul style="list-style-type: none"> $y = (x + 2)^2 \dots$ $y = \dots - 11$ |
| | | <ul style="list-style-type: none"> $(-2, -11)$ |
| 3. | <ul style="list-style-type: none"> Subtracts 5 Divides by 3 Square root | <ul style="list-style-type: none"> $g - 5 = 3h^2$ $\frac{g-5}{3} = h^2$ $h = \sqrt{\frac{(g-5)}{3}}$ |
| 4. | <ul style="list-style-type: none"> Correct use of quadratic formulae Simplifies Solutions Correct rounding | <ul style="list-style-type: none"> $x = \frac{5 \pm \sqrt{(-5)^2 - 4 \times 3 \times (-4)}}{2 \times 3}$ $x = \frac{5 \pm \sqrt{73}}{6}$ $x = 2.3$ $x = -0.6$ |
| 5. | <ul style="list-style-type: none"> Correct formula Final answer | <ul style="list-style-type: none"> $V = \frac{4}{3} \times \pi \times 6.8^3$ $V = 1317.09 \text{ cm}^3$ |
| | <ul style="list-style-type: none"> Generates equation Begins to find height Final height with units | <ul style="list-style-type: none"> $1317.09 = \frac{1}{3} \times \pi \times 5^2 \times h$ $\frac{(1317.09 \times 3)}{\pi \times 5^2} = h$ $h = 50.31 \text{ cm}$ |
| 6. | <ul style="list-style-type: none"> Rearranges to find $\cos x$ Finds related angle Final solutions | <ul style="list-style-type: none"> $\cos x = \frac{1}{3}$ $RA \rightarrow x = 70.5^\circ$ $x_1 = 70.5^\circ$ and $x_2 = 289.5^\circ$ |
| 7. | <ul style="list-style-type: none"> Correct calculation for year 1 Final year 1 Final statement. | <ul style="list-style-type: none"> 85000×0.82 $Y_1 = 69700$ $Y_2 = 57154$ $Y_3 = 46866.28$ It would take 3 years to depreciate below half its value. |
| 8. | <ul style="list-style-type: none"> Correct fraction Correct calculation Final answer | <ul style="list-style-type: none"> $\frac{160}{360}$ $A = \frac{160}{360} \times \pi \times 20^2$ $A = 558.5 \text{ cm}^2$ |
| | <ul style="list-style-type: none"> Knows how to find arc 1 Finds arc 1 Knows how to find arc 2 Finds arc 2 Final Answer | <ul style="list-style-type: none"> $Arc_1 = \frac{160}{360} \times \pi \times 40$ $Arc_1 = 55.9$ $Arc_2 = \frac{160}{360} \times \pi \times 24$ $Arc_2 = 33.5 \text{ cm}$ Total = 105.36 cm |
| 9. | <ul style="list-style-type: none"> Correct gradient Begins to find equation Final equation in terms of M and P | <ul style="list-style-type: none"> $m = \frac{2}{3}$ $P - 42 = \frac{2}{3}(M - 30)$ $P = \frac{2}{3}M + 22$ |
| | <ul style="list-style-type: none"> Correct substitution Final answer | <ul style="list-style-type: none"> $P = \frac{2}{3} \times 60 + 22$ Physics score 62% |
| 10. | <ul style="list-style-type: none"> Expands brackets Substitutes $1 - \sin^2 x = \cos^2 x$ Final statement | <ul style="list-style-type: none"> $\sin^2 x - \cos^2 x$ $\sin^2 x - (1 - \sin^2 x)$ $2 \sin^2 x - 1$ as required. |

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| 11. | <ul style="list-style-type: none"> • Correct angle • Cosine rule correctly applied • Begins to use cosine rule • Final answer | <ul style="list-style-type: none"> • $\angle LSK = 50^\circ$ • $x^2 = 8^2 + 10^2 - 2 \times 8 \times 10 \times \cos 50$ • $x^2 = 61.15$ • $Distance = 7.82cm^2$ |
| | <ul style="list-style-type: none"> • Use of sine rule to find angle • Begins to use sign rule • Angle • Final bearing | <ul style="list-style-type: none"> • $\frac{\sin x}{8} = \frac{\sin 50}{7.82}$ • $\sin x = \frac{8 \times \sin 50}{7.82}$ • $x = 51.6$ • Bearing = $360 - 70 + 51.6 = 341.6^\circ$ |
| 12. | <ul style="list-style-type: none"> • Volume scale factor • Linear scale factor • Height of cone | <ul style="list-style-type: none"> • $VSF = 8$ • $LSF = 2$ • Height = $2 \times 7 = 14cm$ |
| 13. | <ul style="list-style-type: none"> • Finds $2a + b$ • Begins to find magnitude • Finds magnitude | <ul style="list-style-type: none"> • $2 \begin{pmatrix} 3 \\ -1 \\ 4 \end{pmatrix} + \begin{pmatrix} -1 \\ 6 \\ -2 \end{pmatrix} = \begin{pmatrix} 5 \\ 4 \\ 6 \end{pmatrix}$ • $\sqrt{5^2 + 4^2 + 6^2}$ • 8.77 |
| 14. | <ul style="list-style-type: none"> • Calculation • Final answer | <ul style="list-style-type: none"> • 6000×1.023^2 • £6279.17 |
| | <ul style="list-style-type: none"> • Calculation for Year 2 for <i>BTS</i> • Calculates Year 2 for <i>BTS</i> • Year 3 for both banks. • Final statements. | <ul style="list-style-type: none"> • $BTS Y_2 = 6000 \times 1.015 \times 1.03$ • $BTS Y_2 = £6272.70$ • $R.B. Santa Y_3 = £6423.59$ • $BTS Y_3 = £6460.81$ • It would take 3 years for <i>BTS</i> to give a better return than The Royal Bank of Santander. |