| Day 165 | A Level Maths: C Tier 10-a-day |
|---|---|
| **1** Find $\int \sin(5x + 3)\, dx$. | |
| **2** Expand and simplify $(5 + \sqrt{2})(5 - \sqrt{2})$. | |
| **3** A particle of mass 8 kg changes its speed from 3 m $s^{-1}$ to 6 m $s^{-1}$. Find the increase in its kinetic energy. | |
| **4** $f(x) = (x + 3)^2 + 3$, $x \geq 0$.<br>Find the range of f. | |
| **5** (a) Show that $x^2 - x - 1 = 0$ can be rearranged to $x = 1 + \frac{1}{x}$.<br>(b) Use $x_{n+1}$ = this formula with $x_0 = 2$ to find $x_1$, $x_2$ to 3 d.p. | |

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| **6** Sketch $y = 2(x + 2)(x + 1)(x - 5)$. Write down the coordinates of the points where the curve meets the axes. | |
| **7** A population is $N(\mu, 6^2)$. $H_0$: $\mu = 90$, $H_1$: $\mu \neq 90$.<br>A sample of 16 has mean $\bar{x} = 87.6$.<br>Test at the 5% level. Critical value: $z = \pm 1.96$. | |
| **8** A particle of mass 2 kg is released from rest and falls 4.9 m. Take $g = 9.8$ m s$^{-2}$. Use energy to find (a) the loss in potential energy (3 s.f.), (b) the speed of the particle after falling 4.9 m. | |
| **9** Solve $2\sin^2 x + \sin x = 0$ for $0° \leq x \leq 360°$. | |
| **10** A systematic sample of 30 customers is taken from a numbered list of 450.<br>The first one selected is number 12. Find the number of the 6th one selected. | |