Day 117	A Level Maths: B Tier 10-a-day

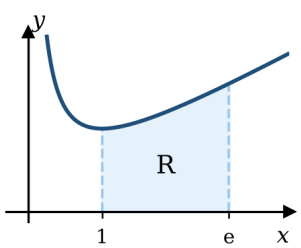
1 Items numbered 1 to 276; systematic sample of size 23.
(a) Find the sampling interval.
(b) The first item is number 7. Find the 3-th item.

2 A lift of mass 200 kg is raised and lowered by a vertical cable. The lift accelerates upwards at $0.25\ \text{m s}^{-2}$.
Take $g = 9.8\ \text{m s}^{-2}$.
Find the tension in the cable.

3 Solve $-2x^2 + 8x - 6 \geq 0$.

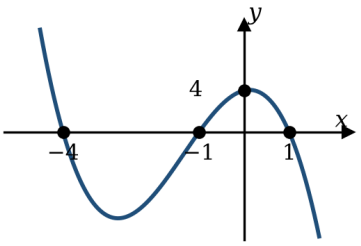
4 15 pairs of height and arm span give $r = 0.390$.
One-tailed critical value (5%): 0.4409.
Test for positive correlation.

5 The region R is bounded by the x-axis, the lines $x = 1$ and $x = e$, and the curve $y = 2x + \frac{2}{x}$. Find the exact area of R.



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6 The diagram shows a sketch of the curve y = f(x), where f is a cubic. The curve meets the axes at the labelled points. Find f(x) in factorised form.



7 Solve $4\cos^2 x - 3\sin x - 4 = 0$ for $0 \leq x \leq 360°$,
giving answers to 1 d.p. where necessary.

8 Express $\frac{3x^2 - 12x + 1}{(x - 3)(x + 1)}$ in the form $P + \frac{Q}{(x - 3)} + \frac{R}{(x + 1)}$.

9 A particle moves along a straight line so that its displacement from O after t s is $s = 3t^3 + 2t^2$ metres.
Find (a) the average velocity over the first 6 seconds, (b) the velocity at t = 6.

10 Given that $\sin A = \frac{7}{25}$ and $\cos B = \frac{8}{17}$, where A and B are acute,
find the exact value of cos(A + B).