Day 188 **A Level Maths: C Tier 10-a-day**

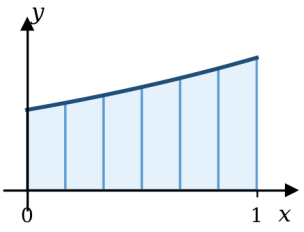
1 Find an equation of the line through A(−4, −5) and B(−5, −1), in the form ax + by + c = 0, where a, b and c are integers.

2 Find the exact value, in radians, of

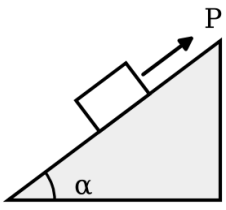
(a) $\arcsin(\frac{1}{2})$ (b) arccos(0)

3 Show, by a counter-example, that the statement "If n^2 is a multiple of 48 then n is a multiple of 48" is false, where n is a positive integer.

4 The diagram shows the curve $y = e^{\frac{x}{2}}$ from x = 0 to x = 1 divided into 6 strips of equal width. Use the trapezium rule with these strips to estimate the shaded area to 3 s.f.



5 A particle of mass 5 kg rests on a smooth plane inclined at α to the horizontal, where $\tan\alpha = \frac{3}{4}$. It is held by a force P N up the slope. Take g = 9.8 m s^{-2}. Find P and the normal reaction.



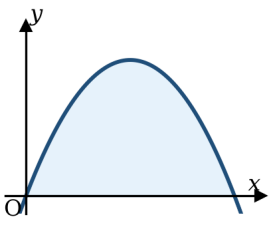
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6 The curve $y = x^2 + 2x$ is translated by the vector $\begin{pmatrix} 2 \\ -1 \end{pmatrix}$.
Find the equation of the new curve, giving your answer in the form $y = ax^2 + bx + c$.

7 Two forces $(8\mathbf{i})$ N and $(-2\mathbf{i} + 3\mathbf{j})$ N act on a particle of mass 3 kg. No other horizontal forces act. Find the acceleration of the particle as a vector in terms of $\mathbf{i}$ and $\mathbf{j}$.

8 $X \sim B(12, p)$. H_0: $p = 0.4$, H_1: $p \neq 0.4$. In a sample, $x = 9$.
Test at the 10% significance level.

9 The diagram shows the curve $y = x(8 - x)$.
Find the area of the shaded region, between the curve and the x-axis.



10 A researcher wants to find out the satisfaction of the customers of a shop.
Give one advantage and one disadvantage of using systematic sampling.