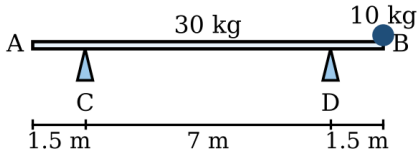
Day 148 **A Level Maths: A Tier 10-a-day**

1 Solve $3^{4x+3} = 2^{x+1}$.
Give your answer to 3 significant figures.

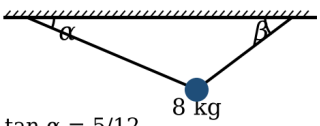
2 The curve y = f(x) has a maximum point at (2, 5).
Find the coordinates of the corresponding point on:
(a) y = f(−x)
(b) y = f(x + 4)
(c) y = f(x) + 5

3 A uniform beam AB rests on supports at C and D, with a particle attached at B. Find the reactions at C and D. Take g = 9.8.



4 A systematic sample is taken from a numbered list of 200 items.
The 6th item chosen is number 28 and the 7th item chosen is number 33.
Find the sampling interval, the number of the first item chosen and the size of the sample.

5 $f(x) = x^2 + 4x + 6$, $x \in \mathbb{R}$, and $g(x) = \frac{10}{x+3}$, $x > -3$.
(a) Find the range of f.
(b) Show that gf is defined and find its range.

Day 148	A Level Maths: A Tier 10-a-day
6 The region bounded by the curve $y = 2\sqrt{x}$, the x-axis, $x = 0$ and $x = 2$ is rotated through 360° about the x-axis. Find the exact volume of the solid formed.	
7 $X \sim B(28, 0.2)$. Find the largest value of c such that $P(X \leq c) < 0.1$.	
8 Expand $(27 + 3x)^{\frac{1}{3}}$ in ascending powers of x, up to and including x^2. State the range of x for which the expansion is valid.	
9 Solve $2\sin^2\theta - 7\cos\theta - 5 = 0$ for $0 \leq \theta \leq 2\pi$.	
10 A 8 kg particle hangs in equilibrium from two light strings, as shown. Find the tension in each string (T_1 in the string at angle α). Take g = 9.8.  $\tan\alpha = 5/12$ $\tan\beta = 3/4$	