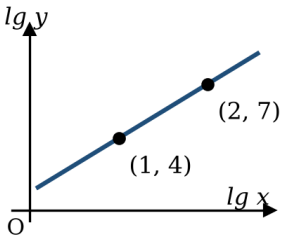
Day 350	A Level Maths: A Tier 10-a-day
1 The 6th term of an arithmetic sequence is 0 and the 12th term is −12. Find the first term and common difference, and the sum of the first 25 terms.	
2 A lift of mass 200 kg carries a person of mass 75 kg. The cable tension is 2777.5 N and the lift is accelerating. Find (a) the magnitude and direction of the acceleration, (b) the force of the floor on the person. Take g = 9.8.	
3 Prove the identity $\sec^2 2x + \operatorname{cosec}^2 2x \equiv 4\operatorname{cosec}^2 4x$	
4 A(7, −2) and B(−3, −2) are the ends of a diameter of a circle. (a) Find the equation of the circle, in the form $x^2 + y^2 + ax + by + c = 0$. (b) Show that C(−1, 2) lies on the circle.	
5 A uniform ladder AB (15 m, 10 kg) rests with A on rough ground, $\mu = 0.3$, and B against a smooth wall, B being 12 m above the ground. A man of mass 60 kg climbs the ladder. How far along the ladder from A can he climb before it slips?	

Day 350	A Level Maths: A Tier 10-a-day
6 Solve $2 \times 2^{2x} - 18 \times 2^{x} + 16 = 0$.	
7 Of 42 students, 15 study Maths (M), 21 Physics (P) and 18 Chemistry (C). 7 study M and P, 8 study M and C, 8 study P and C, and 4 study all three. One student is chosen at random. Given that a student does not study Maths, find the probability that they study Physics.	
8 The diagram shows the graph of lg y against lg x for $y = A x^{n}$. Find the value of n and the value of A. 	
9 The random variable X has pdf $f(x) = \frac{3}{8}x^2$ for $0 \leq x \leq 2$, and 0 otherwise. (a) Find the cumulative distribution function F(x) for $0 \leq x \leq 2$. (b) Find $P(X > 1)$. (c) Find the median of X to 3 s.f.	
10 Find the exact value of $\int_0^2 \frac{6}{2x+1}\,dx$.	