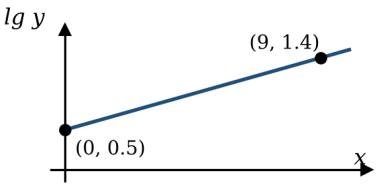
Day 248	A Level Maths: S Tier 10-a-day
1 Solve $12\text{cosec}^2\theta + 7\cot\theta - 11 = 0$ for $0 \leq \theta < 360°$, giving answers to 1 d.p.	
2 A uniform plank AB of length 8 m and mass 60 kg rests on supports at C and D, where AC = 3 m and DB = 3 m. A girl of mass 50 kg stands on it at distance x m from A. Find the range of x for which the plank stays in equilibrium on both supports.	
3 Find the exact gradient of the curve $y = 6^{x-3}$ at the point where x = 7.	
4 Solve $x - 11\sqrt{x} + 30 = 0$.	
5 $y = ab^x$. The graph of lg y against x is the straight line shown. Find a and b to 3 significant figures. 	

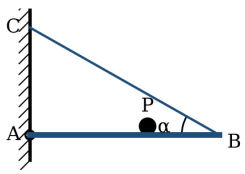
Day 248	A Level Maths: S Tier 10-a-day

6 The function f is defined by $f(x) = 3x^2 - 18x + 35$ for $x \geq k$. Given that k is the least value for which f is one-one, find k, $f^{-1}(x)$, and the domain of f^{-1}.

7 Find the coordinates of the stationary points of $y = 5\cos 2x + 10\cos x$ for $0 < x < 2\pi$, and determine their nature.

8 For 40 observations x, $\Sigma(x - 40) = 60$ and $\Sigma(x - 40)^2 = 1290$.
(a) Find the mean of x.
(b) Find the standard deviation of x.
(c) Find the value of Σx^2.

9 A uniform rod AB (2 m, 120 N) is hinged at A to a vertical wall and held horizontal by a string BC, C on the wall above A, with $\tan \alpha = \frac{4}{3}$, where α is the angle between string and rod. A 20 N particle hangs at P, AP = 1 m.
Find (a) the tension, (b) the magnitude and direction of the hinge force (3 s.f. and 1 d.p.).



10 Find the sum of all the integers from 1 to 219 inclusive that are divisible by 6 or by 10, but not by both.