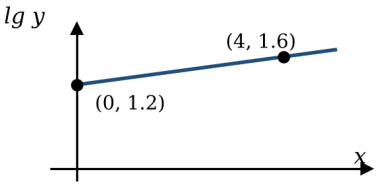
Day 324	A Level Maths: S Tier 10-a-day
1 Find the set of values of x for which both $x^2 - 5x - 6 \geq 0$ and $2x + 4 > -5$.	
2 The pdf of X is $f(x) = a + bx$ for $0 \leq x \leq 2$, and 0 otherwise, where a and b are constants. $E(X) = \frac{37}{30}$. (a) Find a and b. (b) Find $P(X < 1)$.	
3 Solve $2 \ln x = \ln(x + 72) + \ln 1$, stating clearly why one root is rejected.	
4 $f(x) = x^3 + 5x^2 + 11x + 10$. Show that $(x + 2)$ is a factor of f(x), and that the equation $f(x) = 0$ has exactly one real root.	
5 (a) Show that $\frac{\sin 2\theta}{1 + \cos 2\theta} \equiv \tan \theta$. (b) Hence solve $\frac{\sin 2\theta}{1 + \cos 2\theta} = 3$ for $0 \leq \theta < 360°$ (1 d.p.).	

Day 324	A Level Maths: S Tier 10-a-day
6 Solve $x^3 - 5x^2 - x + 5 < 0$.	
7 A river is 80 m wide and flows at 34 m s^{-1}. A boat has speed 16 m s^{-1} in still water and crosses the river heading so that it is carried as little distance downstream as possible. Find the least possible distance downstream between the starting point and the landing point.	
8 Find the exact value of $\tan(\tan^{-1}(\frac{1}{6}) + \tan^{-1}(\frac{4}{3}))$.	
9 $y = ab^x$. The graph of lg y against x is the straight line shown. Find a and b to 3 significant figures. 	
10 A particle P moves on a straight line. At time t = 0, P passes through the fixed point O with velocity 80 m s^{-1}. At time t seconds, P has acceleration $(3t - 26)$ m s^{-2}. Find (a) the times at which P is at O again, (b) the greatest distance of P from O before it first returns to O.	