Day 337	A Level Maths: B Tier 10-a-day
1 Describe the single transformation that maps the graph of $y = f(x)$ onto the graph of: (a) $y = f(2x)$ (b) $y = f(-x)$	
2 Solve $\cos x = -0.3$ for $0 \leq x \leq 2\pi$, giving answers to 3 significant figures.	
3 A car travelling at 8 m s^{-1} brakes and comes to rest with constant deceleration 1.6 m s^{-2}. Find (a) the distance travelled while braking, (b) the time taken to stop.	
4 A curve has equation $4x^2y + 3y^3 - xy = 6$. Find $\frac{dy}{dx}$ in terms of x and y, and the gradient at (1, 1).	
5 Data are modelled by $y = ab^x$, where a and b are constants. A plot of $\log_{10} y$ against x is a straight line with intercept 0.903 and gradient 0.176. Find a and b to 2 significant figures.	

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6 A car of mass 1500 kg tows a trailer of mass 500 kg along a straight horizontal road by a light horizontal tow bar. The resistances are 500 N on the car and 200 N on the trailer. The engine's driving force is 1500 N. Find the acceleration and the tension in the tow bar.	
7 (a) Expand $(1 + x)^{\frac{1}{3}}$ up to the x^2 term. (b) Use $x = 0.03$ to estimate $\sqrt[3]{1.03}$ to 5 decimal places.	
8 A factory says a proportion 0.4 of its parts are defective. In a sample of 50 parts, 26 are defective. Test, at the 5% significance level, whether the proportion is different from 0.4.	
9 The line $3x - 4y = k$ is a tangent to the circle $(x + 1)^2 + (y + 3)^2 = 25$. Find the two possible values of k.	
10 For small θ (in radians), find an approximation of the form $1 + p\theta + q\theta^2$ for $\sin 4\theta + \cos 2\theta + \tan \theta$.	