Day 269	A Level Maths: A Tier 10-a-day
1 £5000 is invested at 6% compound interest per year. Find the smallest whole number of years for the value to exceed £15000.	
2 Solve $16^{2x-1} = 8^{2x+3}$.	
3 Solve $\cos 2\theta - 6\sin\theta = 1$ for $0 \leq \theta \leq 2\pi$.	
4 X has a binomial distribution with mean 27 and variance 10.8. (a) Find n and p. (b) Find P(X = 27) to 3 significant figures.	
5 A curve has parametric equations $x = 2t^2 + 4$, $y = 2t(t^2 - 9)$. Find the coordinates of the points where the curve meets the x-axis.	

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6 A 1000 kg car has engine power 45 kW and constant resistance 750 N. Find (a) its greatest steady speed on a horizontal road, (b) its acceleration at 15 m s^{-1} up a hill where $\sin\alpha = \frac{1}{20}$. Take g = 10.	
7 Express $\frac{x^2 - 6x - 24}{(x+4)(x-4)}$ in the form $1 + \frac{A}{(x+4)} + \frac{B}{(x-4)}$, where A and B are constants to be found.	
8 A curve has equation $x^2 + xy + 3y^2 = 11$. Find the coordinates of the points where the tangent is parallel to the x-axis.	
9 X ~ B(100, 0.25). Use a normal approximation to estimate P(X ≥ 24) to 3 significant figures.	
10 The system is released from rest. Find (a) the magnitude of the acceleration and which particle moves down, (b) the tension. Take g = 9.8. Give answers to 3 s.f. if not exact. 	