Day 35	A Level Maths: A Tier 10-a-day
1 Find the coefficient of x^4 in the expansion of $(1 - 2x)^6$.	
2 Prove the identity $\frac{\sin 2x}{1 - \cos 2x} \equiv \cot x$	
3 Simplify $\frac{x^2 - 1}{(2x - 1)} \div \frac{(x + 1)}{(2x - 4)}$.	
4 Solve $\sin 2\theta = \sqrt{3} \sin \theta$ for $0 \leq \theta \leq 2\pi$.	
5 A ball is thrown vertically upwards at 9.8 m s^{-1} from a point h m above horizontal ground, and hits the ground 3 s later. Find (a) h, (b) the greatest height above the ground. Take g = 9.8.	

Day 35	A Level Maths: A Tier 10-a-day
6 0.5% of people have a disease. The screening test is positive for 96% of those who have it and for 4% of those who do not. (a) Find the probability that a person tests positive. (b) Given a positive test, find the probability that the person has the disease (3 s.f.).	
7 A particle P moves on the x-axis with velocity v = $(6t^2 - 36t + 30)$ m s^{-1} at time t s, $t \geq 0$, and starts at O. Find (a) the times when P is at instantaneous rest, (b) the total distance P travels in the first 6 s.	
8 The 4th term of a geometric sequence is -96 and the 6th term is -384. Find the common ratio and the first term. Find the sum of the first 7 terms.	
9 $g(x) = \frac{1}{30 + 20 \sin x + 21 \cos x}$ (a) Write $20 \sin x + 21 \cos x$ in the form $R \sin(x + \alpha)$, with α acute. (b) Find the greatest and least values of g(x) and the smallest positive x at which the greatest value occurs (1 d.p.).	
10 Complaints occur as a Poisson process at a mean rate of 2 per day. After a change, the number recorded in one day is 4. Test at the 5% level whether the mean rate has increased.	