Day 9	A Level Maths: B Tier 10-a-day
1 In the binomial expansion of $(1 + kx)^n$, where n is a positive integer, the coefficient of x is -18 and the coefficient of x^2 is 135. Find the values of n and k.	
2 A particle moves on a straight line. Its displacement from O at time t seconds is $s = t^3 + t^2 - 6t$ metres. Find its velocity and acceleration when $t = 4$.	
3 Simplify $\frac{6}{\sqrt{6}} + \sqrt{96}$, giving your answer in the form $k\sqrt{6}$.	
4 The mass X g of a flour bag is normal with mean 45. Given $P(X < 47.5) = 0.95$, find the standard deviation (3 s.f.).	
5 A stone is thrown horizontally at 7 m s^{-1} from the top of a platform 4.9 m above level ground. Take g = 9.8 m s^{-2}. Find the time of flight and the horizontal distance from the base where it lands.	

Day 9	A Level Maths: B Tier 10-a-day
6 The equation $3x^2 + kx + 3 = 0$ has equal roots. Find the possible values of k.	
7 Solve $2 \sin x + 8 \cos^2 x - 5 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.	
8 The continuous random variable X has pdf f(x) $= \frac{3x^2}{64}$ for $0 \leq x \leq 4$, and 0 otherwise. (a) Find P(X > 1). (b) Find the median of X, to 3 significant figures.	
9 £1000 is invested at 10% compound interest per year. Find the least whole number of years for the investment to exceed £5000.	
10 A cup of tea cools in a room at 20°C: $\frac{dT}{dt} = -k(T - 20)$. Initially T = 90 and after 6 minutes T = 55. Find k to 3 s.f. and the time to cool to 30°C, to 3 s.f.	