Day 253	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 8 and the coefficient of x^2 is 28. Find the values of n and k.	
2 A train travelling at 14 m s^{-1} brakes and comes to rest with constant deceleration 2 m s^{-2}. Find (a) the distance travelled while braking, (b) the time taken to stop.	
3 Find the exact value of $\arctan(\tan \frac{5\pi}{6})$.	
4 A particle moves on a straight line. Its displacement from O at time t seconds is $s = 4t^3 + 4t^2 + 7t$ metres. Find its velocity and acceleration when t = 4.	
5 The equation $3x^2 + kx + 27 = 0$ has equal roots. Find the possible values of k.	

Day 253	A Level Maths: B Tier 10-a-day
6 The radius of a circular oil slick increases at 2 cm per second. Find the rate at which its area is increasing when r = 8 cm, in terms of π.	
7 (a) Expand $(1 - x)^{-1}$ in ascending powers of x up to and including the term in x^3. (b) State the range of values of x for which the expansion is valid.	
8 Find the exact value of $\int_0^{\frac{\pi}{2}} \frac{2\cos x}{\sin x + 3}\,dx$, giving your answer in the form a ln b.	
9 The length X cm of a metal rod is normal with mean 250, s.d. 0.5. Find, to 3 s.f., the probability a value is (a) more than 249.2, (b) between 249.2 and 249.5.	
10 9 values of x are coded using $y = \frac{(x - 200)}{5}$. $\Sigma y = 4$ and $\Sigma y^2 = 102$. Find the mean and standard deviation of x (3 s.f.).	