Day 314	A Level Maths: B Tier 10-a-day
1 Solve $-3x + 9 \leq 2x - 9$.	
2 Given that $y = x^2e^{-3x}$, find $\frac{dy}{dx}$, and its value when $x = 0$.	
3 $f(x) = 3x - 6$ and $g(x) = x^2 + 6$ for $x \in \mathbb{R}$. (a) Find $fg(x)$. (b) Solve $gf(x) = 15$.	
4 A car of mass 1000 kg moves along a horizontal road. The engine works at a constant rate of 20 kW. The resistance to motion is constant at 500 N. Find the acceleration when the speed is 10 m s^{-1}.	
5 A battery lasts X hours, normal with mean 45, s.d. 0.5. Find k (3 s.f.): (a) $P(X < k) = 0.25$, (b) $P(X > k) = 0.01$.	

Day 314	A Level Maths: B Tier 10-a-day
6 Solve $2 \ln x = \ln(x + 6)$.	
7 $X \sim B(20, p)$. H_0: $p = 0.25$ is to be tested against H_1: $p < 0.25$ at the 10% significance level. Find the critical region and the actual significance level.	
8 Express $\frac{3x^2 + 11x - 38}{(x - 1)(x + 5)}$ in the form $P + \frac{Q}{(x - 1)} + \frac{R}{(x + 5)}$.	
9 Use integration by parts to find the exact value of $\int_0^{\frac{\pi}{4}} (2x - 1) \cos 2x \, dx$.	
10 A particle moves in a straight line. At time t s its velocity is $v = 24t - 4t^2$ m s^{-1}, for $t \geq 0$. Find the maximum speed of the particle and the time at which it occurs.	