Day 161	A Level Maths: S Tier 10-a-day
1 Solve $\sqrt{4x + 9} = 2x - 3$.	
2 Solve the simultaneous equations $\log_2 x + \log_2 y = 5$ $x - y = 31$	
3 Solve $\|4x - 3\| > -2x + 6$.	
4 A particle is projected at 15 m s^{-1} up a line of greatest slope of a rough plane inclined at α to the horizontal, where $\sin\alpha = \frac{4}{5}$ and $\mu = 0.2$. Find (a) the distance it travels up the plane, to 3 s.f., (b) its speed on returning to its starting point. Take g = 9.8 m s^{-2}.	
5 A bag has 5 red counters and some grey counters, n in total. Two are taken without replacement. P(both red) = $\frac{5}{33}$. Find n.	

Day 161	A Level Maths: S Tier 10-a-day
6 A curve has parametric equations $x = t^2 - 2t$, $y = 3t^3 + t$. Find the equation of the tangent at the point where $t = 2$, in the form $y = mx + c$.	
7 The mass of a parcel is $N(115, 10^2)$ kg. A parcel is 'heavy' if it exceeds 131. (a) Find the probability that a parcel is heavy. (b) 11 parcels are chosen at random. Find the probability that at least 4 are heavy.	
8 A sequence is defined by $u_1 = -1$ and $u_{n+1} = \frac{2u_n + 4}{2u_n - 2}$. Show that the sequence is periodic and find $\sum_{r=1}^{60} u_r$.	
9 Use a suitable trigonometric identity to find the exact value of $\int_0^{\pi/2} \sin 3x \cos x \, dx$	
10 A plank of mass 2 kg lies on a smooth horizontal table, with a block of mass 4 kg on it ($\mu = 0.5$ between them). A horizontal force P N acts on the plank. (a) Find the greatest P for which the block does not slip. (b) Find the accelerations of block and plank when P = 44.1. Take $g = 9.8$ m s^{-2}.	