Day 160	S Tier 10-a-day
1 40 deer in a forest are caught, marked and put back. Later, a second sample of 120 deer is caught. 2 of these are marked. (a) Work out an estimate for the number of deer in a forest. (b) State one assumption you have made.	
2 Triangle T has vertices A(6, −2), B(7, 0), C(6, −3). T is enlarged with scale factor 3 and centre (4, −2). (a) Write down the coordinates of the image of A. (b) The area of T is 6 square units. Work out the area of the image of T.	
3 $f(x) = \frac{6x - 2}{2x - 6}$ where $x \neq 3$ (a) Show that $ff(x) = x$. (b) Write down $f^{-1}(x)$.	
4 Here are five numbers: $x + 1$, $3x - 2$, $x + 3$, $3x + 1$, $x - 1$. The mean of the five numbers is 13. (a) Work out the value of x. (b) Work out the range of the five numbers.	
5 A runner covers 600 metres, correct to the nearest 10 metres, in a time of 22.6 seconds, correct to 1 decimal place. (Calculator) Work out the upper bound of the runner's average speed in metres per second. Give your answer correct to 3 significant figures.	

Day 160	S Tier 10-a-day
6 A bag contains 2 red counters, 2 blue counters and 3 green counters. Two counters are taken at random without replacement. Work out the probability that (a) both are the same colour, (b) they are different colours.	
7 Write $\frac{4^{n-2} \times 16^{n-1}}{2^n}$ in the form 2^{an+c} where a and c are integers.	
8 In one country, income tax is worked out like this: The first £15,000 of income is not taxed. The next £30,000 is taxed at 20%. All income above that is taxed at 40%. Lena earns £58,000 in a year. Work out how much income tax Lena pays.	
9 A sector of a circle has radius 10 cm and angle 72°. The sector is made into a cone by joining the two straight edges together. (a) Work out the radius of the base of the cone. (b) Work out the exact volume of the cone. Give your answer in terms of π, as a surd if necessary.	
10 Solve the simultaneous equations $4x + 4y = -12$ $-3x + 2y = 4$	