Day 170	S Tier 10-a-day
1 A metal pipe is a hollow cylinder with outer radius 5 cm and inner radius 3.5 cm. (Calculator) The density of the metal is 7.3 g/cm^3. The mass of the pipe is 23.4 kg. Work out the length of the pipe. Give your answer in centimetres correct to 3 significant figures.	
2 Here are five numbers: $2x - 1$, x, $2x + 6$, $2x + 3$, $x + 3$. The mean of the five numbers is 7. (a) Work out the value of x. (b) Work out the range of the five numbers.	
3 The vectors $\begin{pmatrix} k \\ 25 \end{pmatrix}$ and $\begin{pmatrix} 3 \\ 3k \end{pmatrix}$ are parallel. k is a positive number. Work out the value of k.	
4 (a) Write $-3 - 4x - x^2$ in the form $a - (x + b)^2$ (b) Write down the maximum value of $-3 - 4x - x^2$ and the value of x for which it occurs.	
5 y is directly proportional to the cube of x. When x = 4, y = 448. (a) Find a formula for y in terms of x. (b) Work out the value of y when x = 3.	

Day 170	S Tier 10-a-day
6 A circle has centre C(4, −2) and passes through the point P(6, 7). Find an equation of the circle.	
7 Work out $(1.9 \times 10^{-5})^2$ Give your answer in standard form.	
8 x is an obtuse angle and $\sin x = \frac{1}{8}$. (a) Find the exact value of cos x. (b) Find the exact value of tan x. Give each answer as a fraction or a surd. Do not use a calculator.	
9 Hana invests £7,300 in an account paying compound interest. The interest rate is the same percentage each year. After 2 years the account holds £14,308. Work out the annual percentage interest rate.	
10 Show that the line y = 2x + 20 is a tangent to the circle $x^2 + y^2 = 80$. Find the coordinates of the point where the line touches the circle.	