Day 329	A Level Maths: B Tier 10-a-day
1 Items numbered 1 to 80; systematic sample of size 8. (a) Find the sampling interval. (b) The first item is number 8. Find the 6-th item.	
2 Given that $\cos\theta = -\frac{3}{5}$ and $90° < \theta < 180°$, find the exact value of $\tan 2\theta$.	
3 A train travelling at 15 m s^{-1} brakes and comes to rest with constant deceleration 5 m s^{-2}. Find (a) the distance travelled while braking, (b) the time taken to stop.	
4 Ordered data, texts sent in a day by 8 students: 12, 14, 23, 24, 32, 33, 37, 37. Find Q_1, Q_3, the IQR and any outliers (more than 1.5 × IQR beyond a quartile).	
5 Simplify $\frac{1 + \cos 2x}{\sin 2x}$, giving your answer as a single trigonometric term.	

Day 329	A Level Maths: B Tier 10-a-day
6 A geometric sequence has first term 200 and common ratio 0.8. Find the smallest n for which the nth term is less than 1.	
7 A uniform rod AB of length 6 m and mass 3 kg is hinged at A and held horizontal by a light string attached at B. The string makes an angle θ with the rod, where $\sin\theta = \frac{3}{5}$. Take g = 9.8 m s^{-2}. Find the tension in the string.	
8 A sequence is defined by $u_{n+1} = \frac{1}{1-u_n}$, $u_1 = \frac{1}{2}$. (a) Show that the sequence is periodic, stating the period. (b) Find u_{100} and $\sum_{r=1}^{100} u_r$.	
9 Points A and B have position vectors $\begin{pmatrix} 3 \\ 4 \\ -2 \end{pmatrix}$ and $\begin{pmatrix} 11 \\ 5 \\ 2 \end{pmatrix}$. Find AB and the distance AB.	
10 Prove, by exhaustion, that a square number cannot be written in the form 4k + 3, where k is an integer.	