Day 167	A Level Maths: B Tier 10-a-day
1 $f(x) = x^3 + px^2 + qx - 6$. When f(x) is divided by (x + 2) the remainder is 10, and when divided by (x − 2) the remainder is 2. Find p and q.	
2 $P(X = x) = k(9 - x)$ for $x = 1, 2, ..., 6$. (a) Find k. (b) Find E(X) and Var(X).	
3 $f(x) = \sqrt{4x - 4}$ for $x \geq 1$. Find $f^{-1}(x)$ and state its domain.	
4 (a) Show that $x^2 - 4x - 7 = 0$ can be written as $x = \sqrt{4x + 7}$. (b) Use $x_{n+1} = \sqrt{4x_n + 7}$ with $x_0 = 3$ to find x_1, x_2, x_3 to 4 d.p.	
5 A bead of mass 5 kg is released from rest 22.5 m above the ground and falls freely. Take $g = 9.8$ m s^{-2}. Use energy to find its speed on reaching the ground.	

Day 167	A Level Maths: B Tier 10-a-day

6 A class of width 10, frequency 48, is a bar 2.5 cm wide, 9.6 cm tall.
(a) Find the bar height for width 20, frequency 15.
(b) Find the frequency of a 2 cm by 4 cm bar.

7 Find the sum of all the multiples of 8 that lie between 112 and 295.

8 A block of mass 3 kg is released from rest on a rough plane inclined at angle α to the horizontal, where $\tan\alpha = \frac{5}{12}$.
The coefficient of friction is 0.2. Take g = 9.8 m s^{-2}. Find the acceleration down the plane, and the distance moved in 4 s.

9 Solve $3\sin^2 x + \cos x - 3 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.

10 The region R is bounded by the x-axis, the lines x = 1
and x = 2, and the curve $y = 2x + \frac{2}{x}$. Find the exact area of R.

