Day 148	A Level Maths: S Tier 10-a-day
1 Solve $\frac{4}{(x+1)} > \frac{3}{(x-1)}$.	
2 A shell is projected from level ground with horizontal and vertical velocity components 14.7 and 63.7 m s^{-1}. Find (a) the two times at which it moves at 45° to the horizontal, (b) the horizontal distance between those two points. Take g = 9.8 m s^{-2}.	
3 For 40 observations x, $\Sigma(x-50) = 20$ and $\Sigma(x-50)^2 = 970$. (a) Find the mean of x. (b) Find the standard deviation of x. (c) Find the value of Σx^2.	
4 Prove by contradiction that $\log_6 2$ is irrational.	
5 A is acute and B is acute. cos A = $\frac{21}{29}$ and sin B = $\frac{20}{29}$. Find the exact values of sin(A − B) and sin(A + B).	

Day 148	A Level Maths: S Tier 10-a-day
6 The pdf of X is f(x) = a + bx for $0 \leq x \leq 2$, and 0 otherwise, where a and b are constants. E(X) = $\frac{17}{15}$. (a) Find a and b. (b) Find P(X < 1).	
7 $u_{n+1} = u_n + 2n + 2$, $u_1 = 6$. (a) Show that $u_n = an^2 + bn + c$ and find a, b, c. (b) Find the least n for which $u_n > 849$.	
8 $y = e^{-2x} \cos x$. Show that $dy/dx = e^{-2x}(-2 \cos x - \sin x)$. Find the x coordinate of the stationary point with the smallest positive x (3 s.f.), and its nature.	
9 A particle P moves on a straight line. At time t seconds its velocity is v m s^{-1}, where $v = 3t^2 - 21t + 30$ for $0 \leq t \leq 6$ Find (a) the times at which P is at instantaneous rest, (b) the total distance travelled by P in the first 6 seconds.	
10 $\frac{dy}{dx} = \frac{3x^2}{y}$, $y > 0$, and $y = 4$ when $x = 0$. Find y in terms of x, and the value of y when x = 4.	