Day 277	A Level Maths: B Tier 10-a-day
1 Find the exact value of $\int_0^{\ln 3} \frac{e^x}{e^x + 1}\,dx$, giving your answer in the form a ln b.	
2 A summary of the times, t minutes, taken by 7 people to complete a puzzle gives $\Sigma t = 186$ and $\Sigma t^2 = 5456$. Find the mean and the standard deviation (3 s.f.).	
3 Values of y = f(x) are shown. x: 0, 1, 2, 3, 4 y: 2.1, 2.6, 2.1, 1.8, 1.6 Estimate $\int_0^4 f(x)\,dx$ using the trapezium rule.	
4 A block of mass 5 kg is pulled along rough horizontal ground by a horizontal force of 24.7 N. It accelerates at 2 m s^{-2}. Take g = 9.8 m s^{-2}. Find the coefficient of friction between the block and the ground.	
5 A circle has centre $(-3, -2)$ and passes through the point $(5, -4)$. Find an equation of the circle.	

Day 277	A Level Maths: B Tier 10-a-day
6 A drone moves so that its position vector relative to O at time t s is $\mathbf{r} = (2t^2 - t)\mathbf{i} + (t^3 + t)\mathbf{j}$ metres. Find the velocity when t = 1, and the speed at that time.	
7 Given that each attempt at a task succeeds independently with probability 0.2, find the least number of attempts needed for the probability of at least one success to exceed 0.95.	
8 (a) Show that $x^2 - 4x - 2 = 0$ can be written as $x = \sqrt{4x + 2}$. (b) Use $x_{n+1} = \sqrt{4x_n + 2}$ with $x_0 = 3$ to find x_1, x_2, x_3 to 4 d.p.	
9 Simplify $\frac{8}{\sqrt{2}} - \sqrt{50}$, giving your answer in the form $k\sqrt{2}$.	
10 Find the coefficient of x^3 in the expansion of $(2 + 4x)(1 + 3x)^6$.	