Day 213	A Level Maths: C Tier 10-a-day
1 A sector of a circle has radius 9 cm and angle 1.5 radians. Find (a) the arc length, (b) the perimeter of the sector.	
2 A light plank rests on a pivot. A child of mass 50 kg sits 1 m from the pivot on one side. Where must a child of mass 25 kg sit on the other side for the plank to balance horizontally?	
3 Simplify $\sqrt{16x^2} \times 2x^{-1}$.	
4 $f(x) = e^x - 5$. Use the Newton-Raphson method with $x_0 = 1$ to find x_1 and x_2, giving your answer to 3 decimal places.	
5 Evaluate $\sum_{r=1}^{19} (5r + 1)$.	

Day 213	A Level Maths: C Tier 10-a-day
6 $X \sim B(25, p)$. H_0: $p = 0.5$, H_1: $p < 0.5$. In a sample, $x = 8$. It is given that $P(X \leq 8) = 0.0539$. Test H_0 at the 10% significance level.	
7 $\mathbf{a} = 2\mathbf{i} + 4\mathbf{j} - 3\mathbf{k}$ and $\mathbf{b} = \mathbf{i} + 3\mathbf{j} + 3\mathbf{k}$. Find the angle between a and b, to 1 decimal place.	
8 The velocity of a ball is $(-8\mathbf{i} + 15\mathbf{j})$ m s^{-1}, where $\mathbf{i}$ and $\mathbf{j}$ are perpendicular unit vectors. (a) Find the speed. (b) Find the acute angle between the direction of motion and the line of $\mathbf{i}$. Give 1 d.p.	
9 Prove by contradiction that there are no integers x and y such that $12x + 9y = 37$.	
10 The continuous random variable X has probability density function $f(x) = kx$ for $0 \leq x \leq 4$, and 0 otherwise. Find the value of k.	