Day 273	A Level Maths: B Tier 10-a-day
1 The function $f(x) = e^x - 6x$. Show that $f(x) = 0$ has a root between $x = 2.5$ and $x = 3$.	
2 $X \sim B(10, 0.5)$. Find, to 3 significant figures, (a) $P(1 \leq X \leq 4)$ (b) $P(X > 3)$	
3 A curve has equation $y = \frac{-2}{x+4} + 1$. (a) Write down the asymptotes. (b) Find where the curve crosses the axes.	
4 Given that $\cot \theta = \frac{4}{3}$ and θ is acute, find the exact value of $\sec \theta$.	
5 Prove that the sum of 3 consecutive even integers is always a multiple of 3.	

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6 A car moving in a straight line with constant acceleration increases its speed from 12 m s^{-1} to 30 m s^{-1} while covering 189 m. Find (a) the acceleration, (b) the time taken.	
7 A manufacturer claims that a proportion 0.3 of its sweets are red. A sample of 25 sweets has 12 red. Test, at the 1% level, whether the true proportion is higher than claimed.	
8 Values of y = f(x) are shown. x: 0, 0.5, 1, 1.5, 2, 2.5 y: 3, 1.3, 1, 3, 2.1, 2.8 Estimate $\int_0^{2.5} f(x)\,dx$ using the trapezium rule.	
9 A particle moves in a straight line. At time t s its velocity is $v = 3t - 0.5t^2$ m s^{-1}, for $t \geq 0$. Find the maximum speed of the particle and the time at which it occurs.	
10 Express $\frac{-x + 14}{(x + 1)(x - 4)}$ in partial fractions.	