Day 142	A Level Maths: C Tier 10-a-day
1 Find the gradient of the curve $y = (3x + 2)^3$ at the point where $x = 1$.	
2 Simplify $(2x)^3 \div 2x^2$.	
3 $y = x^3 + 3x^2 - 9x + 5$. Find the coordinates of the stationary points and determine their nature.	
4 $X \sim B(12, p)$. H_0: $p = 0.25$, H_1: $p < 0.25$. In a sample, $x = 0$. It is given that $P(X \leq 0) = 0.0317$. Test H_0 at the 5% significance level.	
5 $x^2 + kx + 4 = 0$ has equal roots. Find the possible values of k.	

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6 Use the substitution u = sin x to find $\int 3 \cos x \sin^4 x \, dx$.	
7 A particle moves in a straight line with constant acceleration. Its speed increases from 2 m s^{-1} to 10 m s^{-1} as it travels 96 m. Find the acceleration.	
8 Expand $(1 + \frac{1}{2}x)^{\frac{1}{3}}$ in ascending powers of x up to and including the term in x^2. State the range of values of x for which the expansion is valid.	
9 For data set A, r = 0.83. For data set B, r = 0.32. Which data set has the stronger linear correlation? Give a reason.	
10 A cyclist starts from rest and accelerates uniformly at 2 m s^{-2} for 10 s, then travels at constant speed for a further 15 s. Find the total distance travelled.	