Day 210	A Level Maths: C Tier 10-a-day
1 For 7 data pairs, with advertising spend (£s hundreds) from 6 to 12, the regression line is S = 4 + 2a. Estimate sales (£s thousands) when a = 11 and comment on the reliability.	
2 A boat moving in a straight line increases its speed from 0 m s^{-1} to 17.5 m s^{-1} with constant acceleration 2.5 m s^{-2}. Find the time taken.	
3 Prove that the sum of the squares of two integers that differ by 1 is always odd.	
4 OA = $\begin{pmatrix}1\\4\\5\end{pmatrix}$ and OB = $\begin{pmatrix}-1\\10\\8\end{pmatrix}$. Find AB and |AB|, and a unit vector in the direction of AB.	
5 Find the first four terms, in ascending powers of x, of the expansion of $(1 - 2x)^4$.	

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6 A sector has radius 10 cm and area 37.5 cm^2.
Find the angle of the sector in radians and the arc length.

7 A particle of mass 26 kg rests on a smooth plane inclined at α to the horizontal, where $\tan\alpha = \frac{12}{5}$.
It is held by a force P N up the slope. Take g = 9.8 m s^{-2}. Find P and the normal reaction.



8 X ~ B(25, p). H_0: p = 0.4, H_1: $p \neq 0.4$. In a sample, x = 13.
Test at the 5% significance level.

9 The line y = 3x + k is a tangent to the curve $y = x^2 + x$.
Find the value of k.

10 Given that $dy/dx = 3x^2$ and y = 1 when x = 0, find y in terms of x.