Day 235	A Level Maths: B Tier 10-a-day
1 Points A and B have position vectors $\begin{pmatrix} 2 \\ -3 \\ 2 \end{pmatrix}$ and $\begin{pmatrix} 5 \\ 3 \\ 4 \end{pmatrix}$. Find AB and the distance AB.	
2 A car moves in a straight line with constant acceleration. Its initial speed is 2 m s^{-1}, its final speed is 18.5 m s^{-1} and it travels 112.75 m. Find the acceleration.	
3 Find the coordinates of the stationary point of the curve $y = xe^{2x}$, and determine its nature.	
4 A particle moves on a straight line. Its displacement from O at time t seconds is $s = t^3 + 6t$ metres. Find its velocity and acceleration when t = 3.	
5 Solve the simultaneous equations $2x + y = 5$ $x^2 + y^2 = 185$	

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6 For small θ (in radians), use the small angle approximations to find the value of $\lim_{\theta \to 0} \frac{\tan 4\theta \sin \theta}{1 - \cos 3\theta}$.	
7 A geometric series has first term 4 and common ratio 3. Find the smallest value of n for which the sum of the first n terms exceeds 20000.	
8 Meteors are seen at random at an average rate of 2.5 per hour. Find the probability that in 120 minutes there are exactly 1 (3 s.f.).	
9 Find the quotient and the remainder when $3x^3 + 3x^2 - 2x + 4$ is divided by $(x + 1)$.	
10 The probability that a student passes a driving test first time is thought to be 0.5. In a sample of 40 students, 15 pass first time. Test, at the 5% significance level, whether the probability is different from 0.5.	