Day 182 **A Level Maths: C Tier 10-a-day**

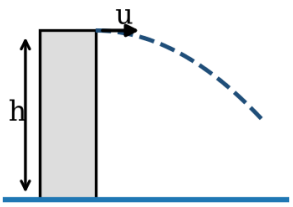
1 Classify each variable as qualitative, discrete or continuous.
(a) the number of cars in a car park
(b) the time taken to run 100 m
(c) the number of siblings a student has

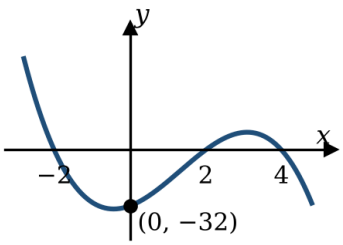
2 $\text{OA} = \begin{pmatrix} 5 \\ -1 \\ -3 \end{pmatrix}$ and $\text{OB} = \begin{pmatrix} 9 \\ 3 \\ 4 \end{pmatrix}$.
Find AB and |AB|, and a unit vector in the direction of AB.

3 A particle moves in a straight line with constant acceleration. Its speed increases from 7 m s^{-1} to 11 m s^{-1} as it travels 24 m. Find the acceleration.

4 The curve $y = x^2 - x + 3$ is translated by the vector $\begin{pmatrix} 2 \\ 2 \end{pmatrix}$.
Find the equation of the new curve, giving your answer in the form $y = ax^2 + bx + c$.

5 A ball is thrown horizontally at 10 m s^{-1} from the top of a vertical cliff of height 78.4 m above the sea. Take g = 9.8 m s^{-2}. Find (a) the time taken to reach the sea, (b) the horizontal distance of the landing point from the cliff.



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6 $f(x) = 4\sin x + 3\cos x + 1$. Write $f(x)$ in the form $R\sin(x + \alpha) + 1$, with α in degrees to 1 d.p., and state the maximum value of $f(x)$.	
7 The diagram shows the curve $y = f(x)$, where $f(x)$ is a cubic. Find $f(x)$ in the form $k(x - a)(x - b)(x - c)$. 	
8 Given that $dy/dx = 5x^2$ and $y = 3$ when $x = 0$, find y in terms of x.	
9 In a histogram, the class 40 to 50 has frequency 30 and is drawn with a bar of height 6 cm. The class 50 to 70 has frequency 30. Find the height of its bar.	
10 Find an equation of the line through A(7, 0) and B(2, −1), in the form $ax + by + c = 0$, where a, b and c are integers.	