Day 6	A Level Maths: B Tier 10-a-day
1 The scores on a test are normally distributed. $P(X < 32) = 0.1587$ and $P(X > 56) = 0.0228$. Find the mean and standard deviation (3 s.f.).	
2 Find the exact value of $\int_1^4 (4x^3 + 1 - \frac{2}{x^2})\,dx$.	
3 Describe the single transformation that maps the graph of $y = f(x)$ onto the graph of: (a) $y = f(-x)$ (b) $y = f(\frac{x}{2})$ (c) $y = f(x + 5)$	
4 The variables x and y satisfy $y = ax^n$. A graph of ln y against ln x is a straight line with gradient 4 that passes through (0, ln 4). Find the values of a and n.	
5 A particle moves so that at time t s its velocity is $\mathbf{v} = (2t^2 + 3)\mathbf{i} + (6t - 24)\mathbf{j}$ m s^{-1}. Find the time when the particle is moving in the direction of $\mathbf{i}$, and its speed then.	

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6 Solve $2x^2 - 2 \geq 0$.	
7 Data are modelled by $y = ax^n$. A plot of $\log_{10} y$ against $\log_{10} x$ is a straight line with intercept 0.778 and gradient 1.5. Find a (2 s.f.) and n, then estimate y when x = 16 (3 s.f.).	
8 A ball is thrown vertically upwards at 4.9 m s^{-1} from a point 29.4 m above horizontal ground. Take g = 9.8 m s^{-2}. Find the time before it hits the ground.	
9 A curve has parametric equations $x = -t$, $y = t^2 - t + 4$. The line $y = -2x + 2$ meets the curve at two points. Find the coordinates of these points.	
10 Simplify $\frac{\sin 2x}{\sin x}$, giving your answer as a single trigonometric term.	