Day 276	A Level Maths: C Tier 10-a-day
1 A particle moves in a straight line. Its displacement from O at time t seconds is s metres, where $s = 3t^3 - 3t^2 + t$. Find its velocity when t = 2.	
2 The vector $\mathbf{p} = -15\mathbf{i} - 8\mathbf{j}$. Find (a) $\lvert\mathbf{p}\rvert$, (b) the angle p makes with the positive x-axis, measured anticlockwise (1 d.p.).	
3 Describe the single transformation that maps the graph of y = f(x) onto the graph of $y = f(\frac{x}{2})$.	
4 A is acute and $\sin A = \frac{8}{17}$. Find the exact values of sin 2A and cos 2A.	
5 Solve x + 3 > 18.	

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6 A particle of mass 8 kg hangs from a light string and is raised at constant speed. Taking g = 9.8 m s^{-2}, find the tension in the string.

7 The discrete random variable X has this distribution.
x: 0, 1, 4, 5
P(X = x): 0.1, 0.1, 0.3, 0.5
Find E(X) and Var(X).

8 $\frac{x + 4}{(x + 2)(x + 3)} \equiv \frac{A}{x + 2} + \frac{B}{x + 3}$.
Find A and B, and hence find $\int \frac{x + 4}{(x + 2)(x + 3)}\, dx$.

9 The probability that it rains is 0.2. If so, the probability that Sam is late is 0.7; otherwise it is 0.2.
Given that Sam is late, find the probability that it rains.

10 The diagram shows the graph of $y = \frac{k}{x - a} + c$ with its asymptotes. Find the values of a, c and k.

