Day 69	A Level Maths: C Tier 10-a-day
1 $x = 4t^2 + 5$, $y = 2t^3 - t$. Find dy/dx in terms of t, and its value when $t = 1$.	
2 A circle has equation $(x - 4)^2 + (y + 2)^2 = 16$. Determine whether the point $P(-7, 3)$ is inside, outside or on the circle.	
3 $a = \begin{pmatrix} 5 \\ 3 \end{pmatrix}$ and $b = \begin{pmatrix} 20 \\ 12 \end{pmatrix}$. Show that a and b are parallel and find the ratio $\lvert b \rvert : \lvert a \rvert$.	
4 A particle starts from rest and moves in a straight line with constant acceleration 4 m s^{-2}. It travels 32 m. Find the time taken.	
5 Prove, by considering the possible remainders, that the square of any integer is of the form $4k$ or $4k + 1$.	

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6 A particle moves in a straight line. Its velocity at time t seconds is $v = (t^2 - 8t + 12)$ m s^{-1}. (a) Find the times when the particle is at rest. (b) Find its acceleration at the first of these times.	
7 $X \sim B(15, p)$. H_0: $p = 0.25$, H_1: $p > 0.25$. Find the critical region for a test at the 10% significance level.	
8 Expand and simplify $(5 - \sqrt{7})(7 + \sqrt{7})$.	
9 The probability that it rains is 0.2. If so, the probability that Sam is late is 0.3; otherwise it is 0.1. Given that Sam is late, find the probability that it rains.	
10 $y = x^3 - 3x^2 - 9x + 5$. Find the coordinates of the stationary points and determine their nature.	