Day 351	A Level Maths: B Tier 10-a-day
1 A train moves in a straight line with constant acceleration. Its initial speed is 13 m s^{-1}, its final speed is 17.5 m s^{-1} and it travels 45.75 m. Find the time taken.	
2 Items numbered 1 to 319; systematic sample of size 29. (a) Find the sampling interval. (b) The first item is number 1. Find the 7-th item.	
3 $f(x) = x^3 + 4x - 9$. Use the Newton-Raphson method with $x_0 = 2$ to find x_1 and x_2, to 4 d.p.	
4 $P(X = x) = k(5 - x)$ for $x = 1, 2, ..., 4$. (a) Find k. (b) Find E(X) and Var(X).	
5 The points A, B and C are $(-2, 1)$, $(-1, -1)$ and $(1, 0)$. (a) Show that angle ABC = 90°. (b) Find the area of triangle ABC.	

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6 Given that $\cos\theta = -\frac{21}{29}$ and $90° < \theta < 180°$, find the exact value of $\sin 2\theta$.	
7 A particle P moves on a straight line from O. At time t s its velocity is $2t^2 - 18t + 36$ m s^{-1}. Find the first time P is at instantaneous rest, and its distance from O then.	
8 The depth of water at a pier is modelled by $D = 8 + 6\sin(\frac{\pi t}{6})$, where t is in hours after noon. Find (a) the greatest and least values, (b) the values of t with $0 \leq t \leq 12$ when it equals 5 m.	
9 $f(x) = x^3 + px^2 + qx - 6$. When f(x) is divided by $(x - 3)$ the remainder is 78, and when divided by $(x - 2)$ the remainder is 32. Find p and q.	
10 Prove that $(4n + 5)^2 - (4n - 5)^2$ is a multiple of 80 for all integer values of n.	