Day 5	A Level Maths: C Tier 10-a-day
1 In an arithmetic sequence $u_5 = 25$ and $u_7 = 33$. Find the first term and the common difference.	
2 Find the exact value, in radians, of (a) $\arcsin(-\frac{1}{2})$ (b) $\arcsin(1)$	
3 The discrete random variable X has this distribution. x: 0, 6, 7, 8 P(X = x): 0.4, 0.2, 0.3, 0.1 Find E(X) and Var(X).	
4 A train's engine works at a constant rate of 22.5 kW. Find the driving force when the vehicle is moving at 15 m s^{-1}.	
5 A curve has parametric equations $x = 3t$, $y = 3t^2 + 1$. Find the gradient at the point where $t = 3$.	

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6 A ball of weight 12 N hangs from a light string, pulled aside by a horizontal force P N so that the string makes an angle θ with the vertical, where $\tan\theta = \frac{4}{3}$. Find P and the tension T N.	
7 Express $\frac{-10x + 12}{(x + 3)(x - 4)}$ in partial fractions.	
8 $\mathbf{a} = 4\mathbf{i} + 2\mathbf{j}$ and $\mathbf{b} = 12\mathbf{i} + k\mathbf{j}$, where k is a constant. Given that a and b are parallel, find the value of k.	
9 Prove that the sum of the squares of two integers that differ by 7 is always odd.	
10 The probability that a patient takes the drug is 0.5. If so, the probability that the patient recovers is 0.5; otherwise it is 0.3. Given that the patient recovers, find the probability that a patient takes the drug.	