Day 345	A Level Maths: C Tier 10-a-day
1 A particle of mass 2 kg slides from rest down a smooth plane inclined at angle α to the horizontal, where $\sin\alpha = \frac{3}{5}$. Take g = 9.8 m s^{-2}. Find (a) its acceleration, (b) its speed after 4 s.	
2 Find the sum of the first 13 terms of the series $-5 - 3 - 1 + 1 + ...$	
3 X ~ B(30, p) and E(X) = 15. Find p and Var(X).	
4 Express $\frac{5x + 21}{(x + 5)(x + 1)}$ in the form $\frac{A}{x + 5} + \frac{B}{x + 1}$. Find the values of A and B.	
5 Divide $f(x) = x^3 + 5x^2 + 4x - 14$ by $(x + 3)$. Find the quotient and the remainder.	

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6 $a = -3\mathbf{i} - 2\mathbf{j} - 3\mathbf{k}$ and $b = \mathbf{i} + 4\mathbf{j} - 3\mathbf{k}$. Find the angle between a and b, to 1 decimal place.	
7 A car of mass 1500 kg tows a caravan of mass 600 kg on a level road with acceleration 0.75 m s^{-2}. Resistances: 200 N on the car, 100 N on the caravan. Find the driving force and the tow bar tension.	
8 A curve has parametric equations $x = 1t$, $y = 6t^2 + 1$. Find the gradient at the point where $t = 2$.	
9 $X \sim B(20, p)$. H_0: $p = 0.4$, H_1: $p \neq 0.4$. In a sample, $x = 14$. Test at the 5% significance level.	
10 Describe the single transformation that maps the graph of $y = f(x)$ onto the graph of $y = f(x - 3)$.	