Day 295	A Level Maths: B Tier 10-a-day
1 Evaluate $\sum_{r=1}^{8} 3^r$.	
2 X ~ B(30, 0.5). Find, to 3 significant figures, (a) P(X < 15) (b) P(X = 14)	
3 Solve $\log_5(x + 27) - \log_5(x - 1) = 1$.	
4 A particle moves along a straight line so that its displacement from O after t s is $s = t^3 + t^2$ metres. Find (a) the average velocity over the first 3 seconds, (b) the velocity at t = 3.	
5 P(B) = 0.4, P(A | B) = 0.25 and P(A) = 0.4. (a) Find P(A ∩ B). (b) Find P(B | A). (c) Find P(A ∪ B).	

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6 A geometric series has first term 6 and common ratio 2. Find the smallest value of n for which the sum of the first n terms exceeds 10000.	
7 A train accelerates uniformly from rest at 1.5 m s^{-2} for 6 s, then travels at constant speed for 15 s, and finally decelerates uniformly at 0.5 m s^{-2} to rest. Find the total distance travelled and the total time of the journey.	
8 The line $5x + 12y = k$ is a tangent to the circle $(x + 1)^2 + (y - 2)^2 = 169$. Find the two possible values of k.	
9 Given that $12 \cos \theta + 5 \sin \theta \equiv 13 \cos(\theta - 22.6°)$, solve $12 \cos \theta + 5 \sin \theta = 5$ for $0 \leq \theta \leq 360°$. (1 d.p.)	
10 Simplify $\frac{\sin 4x}{1 + \cos 4x}$, giving your answer as a single trigonometric term.	