Day 168	A Level Maths: B Tier 10-a-day
1 Find the exact value of $\int_1^e (3x^2 + \frac{3}{x})\,dx$.	
2 P(A) = 0.7, P(B) = 0.2, P(A ∩ B) = 0.14. Find (a) P(A ∪ B), (b) P(A | B). (c) Are A and B independent?	
3 Solve $2x^2 - 11x > -5$.	
4 X ~ B(50, p). H_0: p = 0.4 is to be tested against H_1: p < 0.4 at the 1% significance level. Find the critical region and the actual significance level.	
5 y = f(x) has a maximum point at (−2, −3). Find the turning point on the curve: (a) $y = f(\frac{x}{4})$ (b) y = 2f(x) (c) y = f(−x)	

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6 Find y in terms of x, given that $\frac{dy}{dx} = 2y^2e^x$ and y = 0.5 when x = 0.	
7 (a) Expand $(16 - x)^{-\frac{1}{2}}$ in ascending powers of x up to and including the term in x^3. (b) State the range of values of x for which the expansion is valid.	
8 A cup of tea cools in a room at 10°C: $\frac{dT}{dt} = -k(T - 10)$. Initially T = 70 and after 6 minutes T = 55. Find k to 3 s.f. and the time to cool to 20°C, to 3 s.f.	
9 A particle moves in a straight line. At time t seconds its acceleration is $3t + 4$ m s^{-2}. When t = 0 the velocity is 2 m s^{-1}. Find the velocity when t = 4.	
10 A block of mass 5 kg is projected along a rough horizontal surface with speed 8.4 m s^{-1} and comes to rest after sliding 12 m. Take g = 9.8 m s^{-2}. Use work and energy to find the coefficient of friction.	