Day 23	A Level Maths: A Tier 10-a-day
1 X, the height (cm), is N(171, 7^2). Find the symmetric limits about the mean between which the central 95% of values lie (3 s.f.).	
2 Particles A (6 kg) and B (4 kg) hang on a light string over a smooth pulley, A being 1.5 m above the ground. Released from rest; A lands without rebounding. Find (a) the tension while both move, (b) the greatest height of B above its start. Take g = 9.8.	
3 The curve y = f(x) has a minimum point at (5, 5). Find the coordinates of the corresponding point on: (a) y = f(x) + 5 (b) y = f(−x) (c) y = f(x + 1)	
4 $y = (4x + 6)e^{-2x}$. Find the exact coordinates of the stationary point and determine its nature.	
5 The random variable X has probability density function f(x) = kx(3 − x) for $0 \le x \le 3$, and 0 otherwise. (a) Find k. (b) Find E(X). (c) Find P(X > 1).	

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6 Find the exact coordinates of the stationary point of $y = \frac{e^{2x}}{x}$ for $x > 0$.	
7 A particle moves in a straight line with velocity $v = (-3t^2 + 24t)$ m s^{-1} at time t s, $t \geq 0$, starting at O. Find (a) its greatest speed, (b) its distance from O when t = 8, (c) the time at which it returns to O.	
8 In the expansion of $(1 + kx)^n$, where n is a positive integer, the coefficient of x is 10 and the coefficient of x^2 is 45. Find n and k.	
9 Solve $\|x + 7\| > \|4x + 8\|$.	
10 A is acute and B is obtuse, with $\sin A = \frac{5}{13}$ and $\cos B = -\frac{7}{25}$. Find the exact values of tan(A+B) and cos(A+B).	