Day 135	A Level Maths: B Tier 10-a-day
1 Use integration by parts to find the exact value of $\int_1^2 x^2 \ln x \, dx$.	
2 A puck of mass 3 kg is moving on a smooth horizontal surface at 0 m s^{-1} when a constant horizontal force of 6 N, in the direction of motion, acts for 2 s. Find the speed of the puck at the end of this time and the distance it moves.	
3 80 students: 23 play football, 11 play tennis, 52 do neither. (a) How many do both? (b) Given a person who plays football, find P(this person plays tennis).	
4 A person of mass 80 kg stands on the floor of a lift. The lift accelerates downwards at 0.6 m s^{-2}. Take g = 9.8 m s^{-2}. Find the normal reaction between the person and the floor.	
5 $f(x) = x^3 + 4x - 6$. Use the Newton-Raphson method with $x_0 = 1$ to find x_1 and x_2, to 4 d.p.	

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6 Solve $\|2x - 4\| > 6$.	
7 The continuous random variable X has pdf f(x) = kx^2 for $0 \leq x \leq 5$, and 0 otherwise. (a) Find the value of k. (b) Find P(X > 2). (c) Find E(X).	
8 Solve the equation $5^{2x} - 26\times5^{x} + 25 = 0$.	
9 (a) Write $\frac{3x + 18}{(x + 2)(x + 5)}$ in partial fractions. (b) Hence evaluate $\int_0^4 \frac{3x + 18}{(x + 2)(x + 5)}\,dx$, giving the answer as a single logarithm.	
10 A circle passes through A(9, −6) and B(−7, −10), and its centre lies on the y-axis. Find the centre and the equation of the circle.	