Day 216	A Level Maths: B Tier 10-a-day
1 25 pairs of hours of sleep and reaction time give r = 0.440. Two-tailed critical value (5%): 0.3961. Test for correlation.	
2 A crate of mass 4 kg is pulled along rough horizontal ground by a horizontal force of 13.84 N. It accelerates at 1.5 m s^{-2}. Take g = 9.8 m s^{-2}. Find the coefficient of friction between the crate and the ground.	
3 $f(x) = \sqrt{2x + 1}$ for $x \geq -\frac{1}{2}$. Find $f^{-1}(x)$ and state its domain.	
4 Two forces $(4\mathbf{i} + 8\mathbf{j})$ N and $(2\mathbf{i})$ N act on a particle of mass 5 kg. Find the magnitude of the acceleration of the particle.	
5 Find (a) $\int e^{2x}\,dx$, (b) the exact value of $\int_0^1 e^{2x}\,dx$.	

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6 $f(x) = 2x^3 + kx^2 - 20x - 48$. Given that $(x + 2)$ is a factor of $f(x)$, (a) find the value of k, (b) factorise $f(x)$ completely.	
7 Given that each trap catches a rabbit independently with probability 0.05, find the least number of traps needed for the probability of at least one success to exceed 0.95.	
8 (a) Write $\frac{-5x - 18}{(x + 3)(x + 4)}$ in partial fractions. (b) Hence evaluate $\int_0^3 \frac{-5x - 18}{(x + 3)(x + 4)}\,dx$, giving the answer as a single logarithm.	
9 Find the set of values of x for which $4x - 3 \geq -3$ and $x^2 - 9x + 20 \geq 0$.	
10 A sector of a circle has radius 11 cm and area $\frac{363\pi}{4}$ cm^2. Find the angle of the sector in degrees.	