Day 65	A Level Maths: B Tier 10-a-day
1 A stone is thrown horizontally at 30 m s^{-1} from the top of a building 30.625 m above level ground. Take g = 9.8 m s^{-2}. Find the time of flight and the horizontal distance from the base where it lands.	
2 Simplify $\frac{(4x)^3 \times 6x^3}{4x^2}$.	
3 The mass X g of a flour bag is normal with mean 500, s.d. 3. Find, to 3 s.f., the probability a value is (a) less than 506, (b) between 506 and 509.	
4 A crate of mass 3 kg is pulled along rough horizontal ground by a horizontal force of 22.2 N. It accelerates at 2.5 m s^{-2}. Take g = 9.8 m s^{-2}. Find the coefficient of friction between the crate and the ground.	
5 P(B) = 0.3, P(A | B) = 0.6 and P(A) = 0.5. (a) Find $P(A \cap B)$. (b) Find P(B | A). (c) Find $P(A \cup B)$.	

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6 Solve $\|3x + 1\| = \|x + 1\|$.	
7 Given that $2\cos\theta + 3\sin\theta \equiv \sqrt{13}\cos(\theta - 56.3°)$, solve $2\cos\theta + 3\sin\theta = -2.5$ for $0 \leq \theta \leq 360°$. (1 d.p.)	
8 A new car costs £25000. Its value falls by 10% each year. (a) Find its value after 4 years (nearest £). (b) In which year does it first fall below £3000?	
9 For small θ (in radians), use $\sin\theta \approx \theta$ and $\cos\theta \approx 1 - \frac{\theta^2}{2}$ to find the value of $\lim_{\theta \to 0} \frac{1 - \cos 6\theta}{\theta \sin\theta}$.	
10 Find the coordinates of the stationary point of the curve $y = e^{2x} - 8e^{x}$, and determine its nature.	