Day 207	A Level Maths: C Tier 10-a-day
1 Write $\sqrt{45}$ in the form $p\sqrt{q}$, where q is an integer as small as possible.	
2 A rock is thrown vertically upwards with speed 19.6 m s^{-1}. Take g = 9.8 m s^{-2}. (a) Find the time taken to reach its greatest height. (b) Find the greatest height reached.	
3 The point P(5, −5) lies on the curve y = f(x). Write down the coordinates of the image of P on (a) y = f(x − 3) (b) y = 4f(x)	
4 A particle moves in a straight line. Its acceleration at time t seconds is (4t + 3) m s^{-2}. When t = 0 its velocity is 3 m s^{-1}. Find its velocity when t = 2.	
5 θ is small and measured in radians. Use the small angle approximations to find an approximation for $1 - \cos 6\theta$.	

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6 A population is N(μ, 6^2). H_0: $\mu = 30$, H_1: $\mu < 30$. A sample of 16 has mean $\bar{x} = 25.2$. Test at the 5% level. Critical value: $z = -1.645$.	
7 Variables x and y satisfy $y = ax^n$. A graph of $\log_{10} y$ against $\log_{10} x$ is a straight line with gradient 2 and intercept 1.1. Find n and a, giving a to 3 significant figures.	
8 The discrete random variable X has this distribution. x: 0, 1, 5, 6 P(X = x): 0.2, 0.1, 0.4, 0.3 Find E(X) and Var(X).	
9 Sketch $y = \lvert 2x + 2 \rvert$. Write down the coordinates of the vertex and of the point where the graph meets the y-axis.	
10 A line has equation $\mathbf{r} = \begin{pmatrix} 4 \\ 2 \\ 2 \end{pmatrix} + t\begin{pmatrix} 1 \\ 1 \\ 2 \end{pmatrix}$. Find the coordinates of the point on the line where t = 2.	