Day 228	A Level Maths: A Tier 10-a-day
1 The curve y = f(x) has a maximum point at (−4, 3). Find the coordinates of the corresponding point on: (a) y = f(4x) (b) y = f(x + 2) (c) y = f(−x)	
2 A ball is projected from a point O on horizontal ground at angle α above the horizontal, $\tan\alpha = \frac{4}{3}$, and passes through A, 18 m horizontally from O and 19.1 m above the ground. Find the speed of projection. Take g = 9.8.	
3 Solve $4^{3x-2} = 32^{x+2}$.	
4 Find the least integer n for which $7^n > 10^6$.	
5 The line −4x + 3y = k is a tangent to the circle $(x-2)^2 + (y+2)^2 = 36$. Find the two possible values of k.	

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6 The line l has equation $\mathbf{r} = \begin{pmatrix} -2 \\ -2 \\ -1 \end{pmatrix} + t\begin{pmatrix} 3 \\ 0 \\ 0 \end{pmatrix}$. Find the coordinates of the foot of the perpendicular from P(1, −5, −3) to l, and the exact distance from P to l.	
7 A particle is projected up a line of greatest slope of a smooth plane inclined at α. It passes A, 31.36 m from the start, after 4 s and again after 8 s. Find (a) the speed of projection, (b) α to 1 d.p. Take g = 9.8.	
8 $X \sim N(51, 4^2)$. Find $P(X > 60 \mid X > 55)$ to 3 significant figures.	
9 A group of 7 men and 4 women. A team of 4 is chosen at random. Find the probability that the team has exactly 2 of the women.	
10 The tangent to the curve y = ln(x) at the point P passes through the origin. Find the exact coordinates of P and the equation of the tangent.	