Day 229	A Level Maths: A Tier 10-a-day
1 Solve $5^{3x-3} = 7^{2x-3}$. Give your answer to 3 significant figures.	
2 A cyclist passes P with speed 2 m s^{-1} and accelerates uniformly. She travels 200 m in the next 20 s, reaching Q. Find (a) her acceleration, (b) her speed at Q, (c) her speed at the midpoint of PQ. Give answers to 3 s.f. if not exact.	
3 A sector of a circle has arc length 16.5 cm and area 90.75 cm^2. Find the radius of the circle and the angle of the sector, in radians.	
4 $f(x) = \frac{3x+3}{2x-1}$, $x \in \mathbb{R}$, $x \neq \frac{1}{2}$. Find $f^{-1}(x)$ and state its domain.	
5 A stone is dropped from rest from the top of a cliff. In the last 2 seconds before it hits the sea it falls 49 m. Find the height of the cliff. Take g = 9.8.	

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6 The mass of an egg is N(68, 4^2). An egg is classed as 'special' if its mass is less than 64. 9 eggs are chosen at random. Find the probability that exactly 3 are special (3 s.f.).	
7 The curve y = f(x), where f(x) = $\frac{2}{x+3} + 2$, is translated by $\begin{pmatrix} -1 \\ 1 \end{pmatrix}$. Write down the equations of the asymptotes of the new curve, and find where it crosses the x-axis.	
8 A claim is that the probability p that a patient recovers is 0.2. In a sample of 18, the number of successes is 6. Test at the 5% level whether p has increased.	
9 Find the coordinates of the stationary points of $y = \frac{x^2}{x-1}$.	
10 f(x) = $\frac{12x+3}{(1-x)(1+2x)}$. (a) Express f(x) in partial fractions. (b) Hence expand f(x) up to x^2. (c) State the range of x for which the expansion is valid.	