Day 300	A Level Maths: B Tier 10-a-day
1 A cyclist moves in a straight line with constant acceleration. Its initial speed is 13 m s^{-1}, its final speed is 25 m s^{-1} and its acceleration is 4 m s^{-2}. Find the time taken.	
2 Given that $\tan\theta = 1$ and θ is acute, find the exact value of $\sec\theta$.	
3 Solve $2x^2 - 9x > -9$.	
4 A woman of mass 70 kg stands on weighing scales in a lift. The lift decelerates at 0.25 m s^{-2} while moving downwards. Take $g = 9.8$ m s^{-2}. Find the force exerted on the woman by the scales.	
5 The radius of a circular oil slick increases at 1.5 cm per second. Find the rate at which its area is increasing when $r = 8$ cm, in terms of π.	

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6 $X \sim B(40, p)$. H_0: $p = 0.3$ is to be tested against H_1: $p > 0.3$ at the 10% significance level.
Find the critical region and the actual significance level.

7 A sequence is defined by $u_{n+1} = \frac{1}{1 - u_n}$, $u_1 = \frac{1}{2}$.

(a) Show that the sequence is periodic, stating the period.

(b) Find u_{20} and $\sum_{r=1}^{20} u_r$.

8 $X \sim B(60, 0.3)$. Use a normal approximation to find $P(19 \leq X \leq 26)$, to 3 significant figures.

9 Simplify $\operatorname{cosec} 2x + \cot 2x$,
giving your answer as a single trigonometric term.

10 The diagram shows the curve $y = f(x)$, a quadratic.

(a) Find the coordinates of the local maximum point of $y = |f(x)|$.

(b) How many solutions has $|f(x)| = 1$?

