Day 105	A Level Maths: B Tier 10-a-day
1 Simplify $\frac{4}{\sqrt{2}} + \sqrt{32}$, giving your answer in the form $k\sqrt{2}$.	
2 A car of mass 1000 kg moves along a straight horizontal road. The engine produces a driving force of 3500 N and the resistance to motion is 900 N. Find the acceleration of the car.	
3 $f(x) = 2x - 4$ and $g(x) = x^2 - 3$ for $x \in \mathbb{R}$. (a) Find $fg(x)$. (b) Solve $gf(x) = 141$.	
4 9 values of x are coded using $y = \frac{(x - 100)}{2}$. $\Sigma y = -2$ and $\Sigma y^2 = 158$. Find the mean and standard deviation of x (3 s.f.).	
5 A sequence is defined by $u_{n+1} = -2u_n + 5$, $u_1 = -2$. (a) Find u_2 and u_3. (b) Find $\sum_{r=1}^{4} u_r$.	

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6 (a) Write $\cos\theta + 2\sin\theta$ in the form $R\cos(\theta - \alpha)$, with $R > 0$ and $0 < \alpha < 90°$. (b) Hence find its maximum value and the smallest $\theta \geq 0$ at which it occurs. Give α to 1 d.p.	
7 A stone is projected from ground level with initial velocity components 15 m s^{-1} horizontally and 39.2 m s^{-1} vertically upwards. Take g = 9.8 m s^{-2}. Find (a) the greatest height, (b) the speed at the greatest height.	
8 Find the exact value of $\int_0^{\frac{\pi}{2}} (\cos^2 x + 1 - \sin^2 x)\,dx$.	
9 The random variable X is normally distributed. P(X < 38) = 0.0668 and P(X > 58) = 0.1587. Find the mean and standard deviation (3 s.f.).	
10 Solve $5^x = 35$, giving your answer to 3 s.f.	