Day 87	A Level Maths: C Tier 10-a-day
1 Simplify $\sqrt{2} \times \sqrt{28}$, giving your answer in the form $p\sqrt{q}$, or as an integer.	
2 Find the exact value, in radians, of (a) $\arctan(-1)$ (b) $\arcsin(1)$	
3 A particle moves in a straight line with constant acceleration. Its speed increases from 7 m s^{-1} to 16 m s^{-1} as it travels 41.4 m. Find the acceleration.	
4 Solve $3\cos x = -2$ for $0 \leq x \leq 2\pi$. Give your answers to 3 significant figures.	
5 A population is $N(\mu, 8^2)$. H_0: $\mu = 140$, H_1: $\mu < 140$. A sample of 36 has mean $\bar{x} = 136.13$. Test at the 5% level. Critical value: $z = -1.645$.	

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6 $f(x) = -3x - 8$. Find $f^{-1}(x)$.	
7 $X \sim N(20, 4^2)$. Given that $P(X < a) = 0.7$, find a to 3 s.f.	
8 $f(x) = 12 \sin x + 5 \cos x + 3$. Write $f(x)$ in the form $R \sin(x + \alpha) + 3$, with α in degrees to 1 d.p., and state the maximum value of $f(x)$.	
9 A stone is projected from level ground with velocity $(8\mathbf{i} + 19.6\mathbf{j})$ m s^{-1} ($\mathbf{i}$ horizontal, $\mathbf{j}$ vertically up). Take $g = 9.8$ m s^{-2}. (a) Find the time of flight. (b) Find the horizontal range.	
10 The diagram shows the graph of $y = \frac{k}{x - a} + c$ with its asymptotes. Find the values of a, c and k. 	