Day 260	A Level Maths: B Tier 10-a-day
1 Points A and B have position vectors $\begin{pmatrix} -4 \\ 2 \\ 1 \end{pmatrix}$ and $\begin{pmatrix} -16 \\ -10 \\ 2 \end{pmatrix}$. Find AB and the distance AB.	
2 A circle has centre $(-4, -1)$ and passes through the point $(5, -4)$. Find an equation of the circle.	
3 10 pairs of rainfall and crop yield give r = 0.462. One-tailed critical value (5%): 0.5494. Test for positive correlation.	
4 A car's value, £V, after t years is given by $V = 12000 \times 0.92^t$. Find (a) the value after 3 years, (b) when it first falls below £3000, to 3 s.f.	
5 $f(x) = 3x^2 + 18x + 31$ for $x \geq -3$. Find $f^{-1}(x)$ and state its domain.	

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6 A stone is projected from level ground with horizontal velocity component 26 m s^{-1} and vertical velocity component 9.8 m s^{-1} upwards. Take g = 9.8 m s^{-2}. Find (a) the time of flight, (b) the horizontal range.	
7 A battery lasts X hours, normal with mean 75. Given P(X < 84.3) = 0.99, find the standard deviation (3 s.f.).	
8 Solve $3\tan^2 x + 10\sec x + 11 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p.	
9 Express $\frac{11x - 26}{(2x - 5)(x - 4)}$ in partial fractions.	
10 A rocket is projected from ground level with initial velocity components 17 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.	