Day 95	A Level Maths: B Tier 10-a-day
1 Simplify $\sqrt{72} - \sqrt{2} - \sqrt{8}$, giving your answer in the form $k\sqrt{2}$.	
2 P(A) = 0.5, P(B) = 0.5, P(A ∩ B) = 0.07. Find (a) P(A ∪ B), (b) P(A | B). (c) Are A and B independent?	
3 The points A and B have coordinates $(-6, 1)$ and $(-3, -3)$. (a) Find the midpoint of AB. (b) Find the line AB as ax + by + c = 0, with integer a, b, c.	
4 A uniform rod AB of length 3 m and mass 20 kg hangs horizontally from two vertical strings attached 0.5 m from A and 0.5 m from B. A particle of mass 4 kg is attached 2 m from A. Take g = 9.8 m s^{-2}. Find the tension in each string.	
5 Solve $\cos(x + 0.5) = 0.9$ for $0 \leq x \leq 2\pi$, giving answers to 3 significant figures.	

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6 A curve has parametric equations $x = 2t + 1$, $y = -t^2 - 2t + 2$, $t \in \mathbb{R}$. Find a Cartesian equation of the curve in the form $y = f(x)$.	
7 The variables x and y satisfy $y = ab^x$. A graph of ln y against x is a straight line with gradient ln 3 that passes through (0, ln 6). Find the values of a and b.	
8 A suitcase of mass 5 kg is dragged at constant speed along rough horizontal ground by a rope inclined at angle α above the horizontal, where $\cos\alpha = \frac{12}{13}$. The coefficient of friction is 0.2. Take $g = 9.8$ m s^{-2}. Find the tension in the rope.	
9 R: has the condition; L: test is positive. P(R) = 0.2, P(L | R) = 0.2, P(L | R') = 0.3. (a) Find P(L). (b) Find P(R | L).	
10 Line l_1: $\mathbf{r} = \begin{pmatrix} 0 \\ -4 \\ -4 \end{pmatrix} + \lambda \begin{pmatrix} 0 \\ -2 \\ -2 \end{pmatrix}$. Line l_2: $\mathbf{r} = \begin{pmatrix} -2 \\ 0 \\ -4 \end{pmatrix} + \mu \begin{pmatrix} -2 \\ 2 \\ -2 \end{pmatrix}$. Show that l_1 and l_2 intersect and find the point.	