Day 99	A Level Maths: B Tier 10-a-day
1 A sports club has 45 junior members, 65 senior members and 20 veteran members. A stratified sample of size 26 is taken. Find the number selected from each group.	
2 Solve $8\cos^2 x - 2\sin x - 7 = 0$ for $0 \leq x \leq 360°$, giving answers to 1 d.p. where necessary.	
3 The points A and B have coordinates (8, 7) and $(-2, -5)$. (a) Find the midpoint of AB. (b) Find the line AB as $ax + by + c = 0$, with integer a, b, c.	
4 A has position vector $\begin{pmatrix} -2 \\ -4 \\ 1 \end{pmatrix}$ and B has position vector $\begin{pmatrix} 8 \\ -14 \\ 6 \end{pmatrix}$. The point P lies on AB with AP : PB = 2 : 3. Find the position vector of P.	
5 Evaluate $\left(\frac{32}{243}\right)^{-\frac{3}{5}}$.	

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6 $f(x) = \ln x + x - 2$. Use the Newton-Raphson method with $x_0 = 1.5$ to find x_1 and x_2, to 4 d.p.	
7 A ball is thrown vertically upwards at 14.7 m s^{-1} from a point 19.6 m above horizontal ground. Take $g = 9.8$ m s^{-2}. Find the time before it hits the ground.	
8 The line $y = -3x + 18$ meets the circle $(x + 1)^2 + (y - 1)^2 = 50$ at the points A and B. Find the coordinates of A and B, and the exact length of the chord AB.	
9 X has a binomial distribution with mean 6.25 and variance 4.6875. (a) Find n and p. (b) Find P(X = 6) to 3 significant figures.	
10 A suitcase of mass 9 kg is dragged at constant speed along rough horizontal ground by a rope inclined at angle α above the horizontal, where $\cos\alpha = \frac{3}{5}$. The coefficient of friction is 0.5. Take $g = 9.8$ m s^{-2}. Find the tension in the rope.	