Day 222	A Level Maths: C Tier 10-a-day
1 For 7 data pairs, with days of growth from 10 to 16, the regression line is H = 5 + 3d. Estimate plant height (cm) when d = 25 and comment on the reliability.	
2 Solve $5^{x+1} = 80$. Give your answer to 3 significant figures.	
3 A geometric series has common ratio $\frac{1}{3}$ and sum to infinity 27. Find the first term.	
4 A ball of weight 12 N hangs from a light string, pulled aside by a horizontal force P N so that the string makes an angle θ with the vertical, where $\tan\theta = \frac{5}{12}$. Find P and the tension T N.	
5 A radioactive sample has mass $M = 80\,e^{-0.02t}$ grams after t days. Find the time for the mass to halve, to 3 significant figures.	

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6 Solve $x^2 + 10x - 4 = 0$, giving your answers in the form $p \pm \sqrt{q}$.	
7 A block is on the point of sliding down a rough plane inclined at α to the horizontal, where $\tan \alpha = \frac{5}{12}$. Find the coefficient of friction.	
8 A circle has equation $(x + 4)^2 + (y + 1)^2 = 9$. Determine whether the point P(8, −3) is inside, outside or on the circle.	
9 The probability that a machine is set up wrongly is 0.2. If so, the probability that an item is faulty is 0.7; otherwise it is 0.4. Given that an item is faulty, find the probability that a machine is set up wrongly.	
10 $\mathbf{a} = 2\mathbf{i} - \mathbf{j} + 4\mathbf{k}$ and $\mathbf{b} = 3\mathbf{i} + 4\mathbf{j} + 3\mathbf{k}$. Find the angle between a and b, to 1 decimal place.	