Day 286	S Tier 10-a-day
1 Work out the exact value of cos 45° + tan 45° Give your answer in its simplest form, as a fraction or surd. Do not use a calculator.	
2 A flight leaves London at 15:50 (London time). It takes 9 hours 10 minutes. When it is 12:00 in London it is 14:00 in Cairo. At what time, in Cairo time, does the flight land? Say if it is on a different day.	
3 Solve $\frac{x-4}{3} - \frac{x-3}{8} = -2$	
4 A is the point (3, −3) and B is the point (9, −11). Find an equation of the perpendicular bisector of AB. Give your answer in the form ax + by = c, where a, b and c are integers.	
5 There are 100 bacteria in a sample. The number of bacteria is multiplied by 3 every hour. After how many hours will there first be more than 50,000 bacteria?	

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6 Solve $7 \sin x - 1 = 0$ for $0° \leq x \leq 360°$. (Calculator) Give your answers correct to 1 decimal place.	
7 A population is increased by x% in one year and then increased by a further x% the next year. Over the two years the population increases by 69%. Work out the value of x.	
8 $f(x) = 3x - 3$ and $g(x) = x^2$ Solve $fg(x) = gf(x)$	
9 The probability that it rains on a day is 0.4. If it rains, the probability that Ali is late for school is 0.2. If it does not rain, the probability that Ali is late is 0.3. (a) Work out the probability that Ali is late. (b) Ali is late. Work out the probability that it rained.	
10 Given that $(a + \sqrt{15})(b + \sqrt{15}) = 33 + 9\sqrt{15}$, where a and b are positive integers with $a < b$, find the values of a and b.	