Day 35	S Tier 10-a-day
1 A circle has equation $x^2 + y^2 = 169$. The point P(−12, 5) lies on the circle. (a) Find the equation of the tangent to the circle at P. Give your answer in the form ax + by = c, where a, b and c are integers. (b) The tangent meets the x-axis at the point T. Write down the coordinates of T.	
2 Factorise fully $(x + 2)^2 - 16$	
3 Write $\sqrt{45} - \sqrt{5} + \sqrt{180}$ in the form $a\sqrt{5}$ where a is an integer.	
4 Liam drives 80 km at an average speed of 80 km/h. The drive then continues for another 30 km at an average speed of 20 km/h. Work out the average speed for the whole journey.	
5 A red light flashes every 4 minutes. A blue light flashes every 8 minutes. A green light flashes every 10 minutes. They all flash together at 7:00 am. (a) At what time do they next flash together?	

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6 A fair 6-sided dice and a spinner numbered 1 to 5 are each thrown once. The first score and the second score are recorded. (a) Work out the probability that the product is even. (b) Given that at least one number is 3, work out the probability that the product is even.	
7 The nth term of a sequence is $3n^2 - 2n$. (a) Work out the 8th term. (b) Is 178 a term of the sequence? You must show your working.	
8 Write $\frac{9^{n-1} \times 3^{n-2}}{9^n}$ in the form 3^{an+c} where a and c are integers.	
9 A sector of a circle has angle 150° and area $\frac{845}{12}\pi$ cm^2. (a) Work out the radius of the circle. (b) Work out the length of the arc of the sector. Give your answer to (b) in terms of π.	
10 Machine A makes 70% of the bolts in a factory. Machine B makes the rest. 70% of the bolts from machine A are faulty. 30% of the bolts from machine B are faulty. (a) Work out the probability that a bolt chosen at random is faulty. (b) A faulty bolt is found. Work out the probability that it was made by machine A.	