Day 239	S Tier 10-a-day
1 Factorise $6x^2 - 7x - 20$	
2 A metal pipe is a hollow cylinder of length 50 cm. (Calculator) The outer radius is 4 cm and the inner radius is 2.5 cm. The density of the metal is 7.8 g/cm^3. Work out the mass of the pipe. Give your answer in kilograms correct to 3 significant figures.	
3 The population of a village increased by 60% in 2023. In 2024 the population increased by a further 30%. Work out the overall percentage increase over the two years.	
4 Solve $4x^2 - 7x - 4 = 0$ Give your answers in surd form.	
5 Triangle ABC has AB = 16 cm and BC = 6 cm. The area of triangle ABC is $24\sqrt{2}$ cm^2. Angle ABC is obtuse. Work out the size of angle ABC. Do not use a calculator.	

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6 Write $\frac{15}{2+\sqrt{2}}$ in the form $\frac{p+q\sqrt{2}}{r}$ where p, q and r are integers and r > 1, and the fraction is in its simplest form.	
7 The probability that the 8:15 train is late on any day is $\frac{1}{10}$. Events on different occasions are independent. Work out the probability that this happens at least once in 4 days. Give your answer correct to 3 significant figures. (Calculator)	
8 $f(x) = \frac{2}{x+4} - 1$ (a) Find $f^{-1}(x)$. (b) Find the value of $f^{-1}(0)$.	
9 Rhys changes £300 into euros at £1 = €1.18. Rhys spends €220 and then changes the rest back into pounds at £1 = €1.6. How many pounds does Rhys get back?	
10 ABCD is a rectangle with AB = 10 cm and AD = 11 cm. A point P inside the rectangle is such that AP ≤ 10 cm and P is nearer to A than to B. Work out the area of the region in which P can lie. Give your answer in terms of π and surds.	