Day 220	S Tier 10-a-day
1 Write $27^4 \times 6^3$ as a product of powers of prime numbers.	
2 The mean of 9 numbers is 7. One number is removed and the mean of the remaining 8 numbers is 2.25. Work out the number that was removed.	
3 Zip Taxis has a fixed charge of £5 plus £5.50 per mile. Go Cabs has a fixed charge of £20 plus £4.50 per mile. (a) Work out the number of miles for which the two costs are the same. (b) Which is cheaper for 22 miles, and by how much?	
4 Two statues are mathematically similar. The heights of the statues are 10 cm and 35 cm. The smaller one has volume 200 cm^3. Work out the volume of the larger one.	
5 Kofi cycles $\frac{7}{10}$ of a route before lunch. After lunch he cycles $\frac{4}{9}$ of the remaining distance. He still has 30 km to go. How long is the route, in km?	

Day 220	S Tier 10-a-day
6 Use the iteration formula $x_{n+1} = 4 + \frac{3}{x_n}$ with $x_0 =$ 1 (Calculator) to work out x_1, x_2 and x_3. Give each answer correct to 3 decimal places.	
7 The ratio of men to women in a school is 4 : 1. 25% of the men and 85% of the women own a car. What percentage of all of these students own a car?	
8 A point A is on level ground in line with the base of a mast. (Calculator) The angle of elevation of the top of the mast from A is 54°. B is a point on the same line, 75 m further from the mast than A. The angle of elevation of the top of the mast from B is 38°. Work out the height of the mast. Give your answer to 1 decimal place.	
9 Simplify fully $\frac{x^2 + x - 12}{x + 6} \div \frac{x - 3}{x^2 + 8x + 12}$	
10 A solid metal sphere of radius 9 cm is melted down and recast into a solid cylinder of radius 6 cm. Work out the height of the cylinder. The volume of a sphere of radius r is $\frac{4}{3}\pi r^3$.	