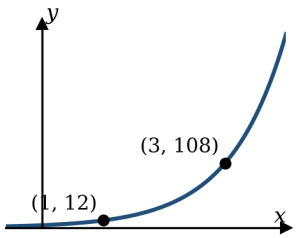
Day 198	S Tier 10-a-day
1 60 beetles in a field are caught, marked and put back. Later, a second sample of 120 beetles is caught. 10 of these are marked. (a) Work out an estimate for the number of beetles in a field. (b) State one assumption you have made.	
2 Two shapes are mathematically similar. The smaller has height 20 cm and area 36 cm^2. The larger has area 5.76 cm^2. Work out the height of the larger shape.	
3 (a) Solve $5 - 3x \geq 14$ (b) n is an integer. Write down all the values of n that satisfy $-8 < 4n + 4 \leq 16$	
4 The ratio of juniors to seniors in a school is 1 : 3. 10% of the juniors and 80% of the seniors play a sport. What percentage of all of these students play a sport?	
5 The diagram shows the graph of $y = ka^x$, where k and a are constants and $a > 0$. The curve passes through the points (1, 12) and (3, 108). Find the value of k and the value of a. 	

Day 198	S Tier 10-a-day
6 A rectangle has area $(35 + 17\sqrt{5})$ cm^2 and length $(4 + \sqrt{5})$ cm. Find the width of the rectangle. Give your answer in the form $a + b\sqrt{5}$	
7 A circular arc has a chord AB of length 40 cm. The greatest distance between the chord and the arc is 10 cm. Work out the radius of the circle.	
8 $f(x) = 4x - 4$ and $g(x) = x^2$ Solve $fg(x) = gf(x)$	
9 A point A is on level ground in line with the base of a lighthouse. (Calculator) The angle of elevation of the top of the lighthouse from A is 60°. B is a point on the same line, 80 m further from the lighthouse than A. The angle of elevation of the top of the lighthouse from B is 40°. Work out the height of the lighthouse. Give your answer to 1 decimal place.	
10 a = 0.567 and b = 0.977, both correct to 3 significant figures. Work out a ÷ b. Write down your answer to a suitable degree of accuracy. You must show your working and give a reason for your answer. (Calculator)	