## Exponentials Mastermind

1. The population of rabbits increases exponentially. In year 1 there were 400 rabbits. By year 3 there were 529 rabbits. How many rabbits were there by year 5?

2. A bank account accrues i\% interest each year. In year 1, the bank account had $£ 5000$ in it. In year 4, the bank account had $£ 5306.04$ in it. How much was in the account in year 10?
3. The bacteria in a petri dish after one hour is 10 per $\mathrm{cm}^{2}$. After 5 hours it is 1690 per $\mathrm{cm}^{2}$. How many bacteria (per $\mathrm{cm}^{2}$ ) will there be in the dish after 9 hours?

4. In 2010 in Tidmouth, 40,000 people were unemployed. By 2012 this had decreased to 39,601 . Assuming the unemployment rate is decreasing exponentially, how many people would you expect to be unemployed in Tidmouth by 2020?
5. In 2008, 1.7m iPhones were sold. In 2012, 35.2 m iPhones were sold. Assuming the sales of iPhones increases exponentially, how many iPhones should be expected to be sold in 2017?

6. A newly born octopus weighs 180 g . After 2 days it weighed 202.248 g . The octopus' weight increases exponentially for the first few weeks of its life. How much will the octopus weigh after 2 weeks?
7. A vase contains 800 ml of water. A daffodil is placed in the vase and after 5 days the vase contains 619 ml of water. Assuming the water in the vase decreases exponentially, how much water was in the vase after 8 days?
8. The diagram on the right shows the curve of $y=a b^{x}$

It passes through the points $A(0,2), B(2,18)$ and $C(6, p)$

Find the value of $p$.


9. The diagram on the right shows the curve of $y=a b^{x}$

It passes through the points $A(0,4), B(3,0.5)$ and $C(10, p)$

Find the value of $p$.
10. The diagram on the right shows the curve of $y=a b^{x}$

It passes through the points $P(2,75)$, and Q $(5,9375)$

Find the values of $a$ and $b$.


