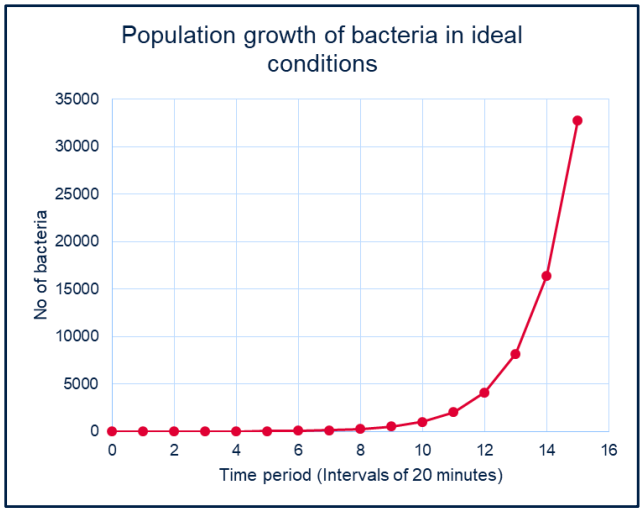
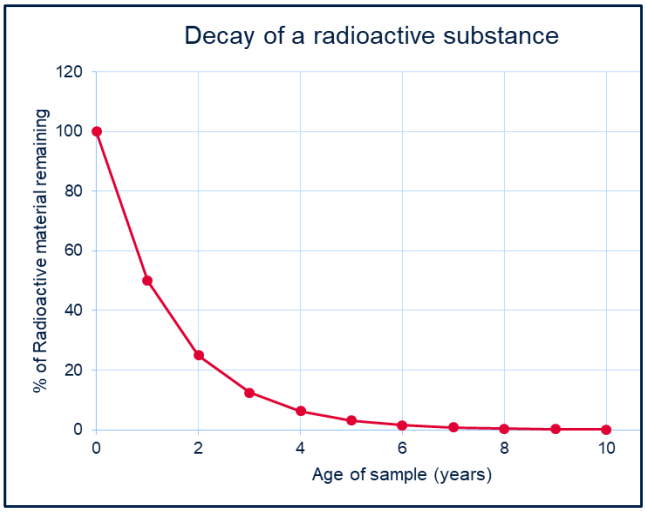
Indices

Did you know?

Indices are also referred to as exponents





e.g. $2^3 = 8$

3 is the 'exponent'

$2^3 = 2 \times 2 \times 2$

It tells us how many times a number is multiplied by itself

This is where exponential graphs come from!

Indices 1

Simplify the following

1. $x^3 \times x^8 =$
2. $\frac{9^8}{9} =$
3. $(2^3)^5 =$
4. $\frac{4^4 \times 4}{(4^2)^3} =$
5. $16^{\frac{1}{2}} =$
6. What is the reciprocal of 16
7. What is 4^{-3}
8. What is $\left(\frac{2}{5}\right)^{-1}$

Indices 2

Simplify the following

1. $t^5 \times t^4 =$
2. $\frac{8^7}{8^2} =$
3. $(3^4)^2 =$
4. $\frac{5^7 \times 5}{(5^3)^3} =$
5. $(8)^{\frac{1}{3}} =$
6. $y^0 =$
7. What is $4^{-3} =$
8. What is $\left(\frac{2}{3}\right)^{-2} =$

Roots and Indices Maze

Can you find the way from one side of the table to the other?

- Begin in the highlighted box
- Move vertically or horizontally one box at a time ……..no diagonal moves allowed
- You may only land on boxes which are equivalent in value to the highlighted one

2^6x2^3	3^2x2^3	$(\sqrt{16})^2$	$(2^3)^3$	$8^3\div8$	4^4x4^{-3}	$(\sqrt[3]{8})^4$	$8x4^2$
$\sqrt{8^3}$	$(2^3)^2$	8^7x8^{-5}	4^3	$2^{-2}x2^7$	64^0	2^5x2^3	$4^7\div2^3$
$(\sqrt{64})^3$	8^2	2^2x2^3	2^3x2^3	$(2^3)^3$	$(\sqrt[3]{8})^6$	4^6x4^{-3}	2^2x4^2
2^6	$(\sqrt{64})^2$	4^6x4^{-2}	$(\sqrt{16})^3$	$(2^2)^4$	$8^3\div2^3$	$2^{-3}x2^7$	$(2^2)^4$
3^5	2^6x2^1	8^3	$4^5\div2^4$	$(-4)^{-3}$	$(2^2)^3$	$(\sqrt{8})^3$	$4^6\div2^6$
4^3x4^{-3}	$(2^5)^1$	$(\sqrt[3]{64})^2$	2^3x8	$2^{-1}x2^7$	$(\frac{1}{4})^{-3}$	16^2	64

Hint : What is the value of 2^6

Matching Pairs

Match the expressions in Column A with their equivalent expression in Column B

A	B
$\left(\frac{9}{16}\right)^{\frac{1}{2}}$	$\frac{3}{2}$
$(4)^{\frac{3}{2}}$	8
$(-5)^{-2}$	$\frac{1}{16}$
$(16)^{-\frac{3}{2}}$	$\frac{1}{4}$
$(2)^{-3}$	$\frac{3}{4}$
$(64)^{-\frac{1}{3}}$	$\frac{1}{25}$
$\left(\frac{4}{9}\right)^{-\frac{1}{2}}$	$\frac{1}{8}$
4^{-2}	$\frac{1}{64}$

Where does it belong?

Five numbers are arranged below in order from least to greatest

$$x, \quad x^3, \quad x^4, \quad x^2, \quad x^0$$

- Where does $-x^{-1}$ belong in the list above?

Hints

- The numbers are arranged in order ($x < x^3 < x^4 < x^2 < x^0$)
- When is a cubed number greater than a squared number?
- Are there any of the terms that you know the value of ?
- Draw a number line and try some values in the expressions – what happens?