

Exponential growth and decay



The function of growth and decay

$$y = A \times b^{kx}$$

... where A , b and k are numbers depending on the given situation.

For example, we saw that when

$A = 920$, $b = 1.017$ and $k = 1$,

we had the bank balance (y) of an initial £920 that has an interest rate of 1.7% at a given time (x).

Changing shape

How does changing the value of A , b and k change the shape of the graph?

Which represent growth, which represent decay?

What scenarios relate to these graphs?

Sketch the graph you've been given and conclude on these.

Changing A

The bigger the magnitude of A, the bigger the gradient of the curve.

The value of A is the y-intercept and represents the initial quantity of y (when $x=0$)

Negative values of A result in the curve bending in the opposite direction.

Changing b

The bigger the magnitude of b , the bigger the gradient of the curve.

If $b > 1$, the graph represents growth.

If $b = 1$, the graph represents a constant value.

If $0 < b < 1$, the graph represents decay.

Changing k

The bigger the magnitude of k , the bigger the gradient of the curve.

If $k > 0$, the graph represents growth.

If $k = 0$, the graph represents a constant value.

If $k < 0$, the graph represents decay.

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