

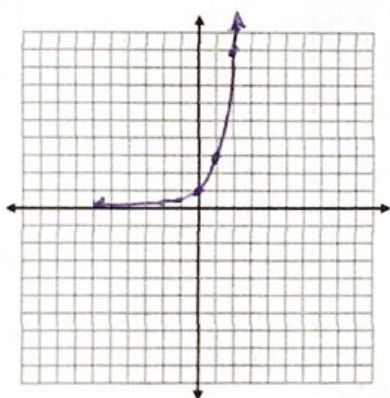
7.2 – Relating the Characteristics of Exponential Functions & Equations

Exponential Function: A function in the form $y = a(b)^x$ where b is the base and x is the exponent.
note: different than before where x was the base and it had exponents 2, 3, ... (x^2, x^3, \dots)

Ex. 1: Complete the table of values and sketch the graph of each function.

a) $y = 3^x$

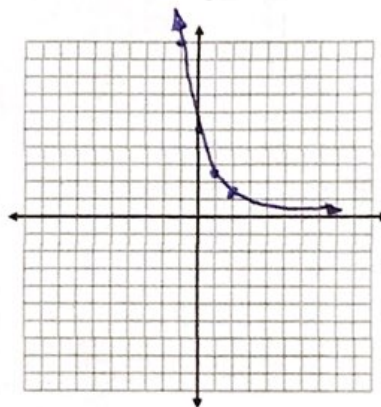
x	y
-2	0.1
-1	0.3
0	1
1	3
2	9



This exponential functions is increasing.

b) $y = 5\left(\frac{1}{2}\right)^x$

x	y
-2	20
-1	10
0	5
1	2.5
2	1.25



This exponential functions is decreasing.

Characteristics of Exponential Functions:

$y = a(b)^x$

Number of x-intercepts	0 (the graph never touches!)
The y-intercept	a (if no value written, a=1)
End Behaviour	QII → QI
Domain	$x \in \mathbb{R}$ (all real numbers)
Range	$y > 0$
Increasing or Decreasing	increasing if $b > 1$ (greater than 1) decreasing if $0 < b < 1$ (between 0 and 1)

Ex. 2: Predict the following characteristics of the given functions.

a) $y = 9\left(\frac{2}{3}\right)^x$

b) $y = 2(5)^x$

Number of x-intercepts	0	0
The y-intercept	9	2
End Behaviour	QII \rightarrow QI	QII \rightarrow QI
Domain	$x \in \mathbb{R}$	$x \in \mathbb{R}$
Range	$y > 0$	$y > 0$
Increasing or Decreasing	decreasing $\left(\frac{2}{3} < 1\right)$	increasing $(5 > 1)$

Ex. 3: Match the exponential equation with its corresponding graph.

a) $y = 3(0.2)^x$
 (ii) y-int decreasing

b) $y = 4(3)^x$
 (iii) y-int increasing

c) $y = 4(0.5)^x$
 (iv) y-int decreasing

d) $y = 2(4)^x$
 (i) y-int increasing

