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Math II

Exponential Functions

An exponential function is a function raised to an exponent.

If a function passes the horizontal line test, any line will only go through one point which makes it one to one.

Never crosses X-axis

Finding Equations of Exponential Functions

$F(X) = AB^{X}$

If $B > 1$ graph will increase

If $O < B < 1$the graph will decrease

Exponential Growth and Decay

Quantity increases/decreases by a fixed percentage over a period of time

$F(x) = a (+/-r)^{x}$

A = Initial amount

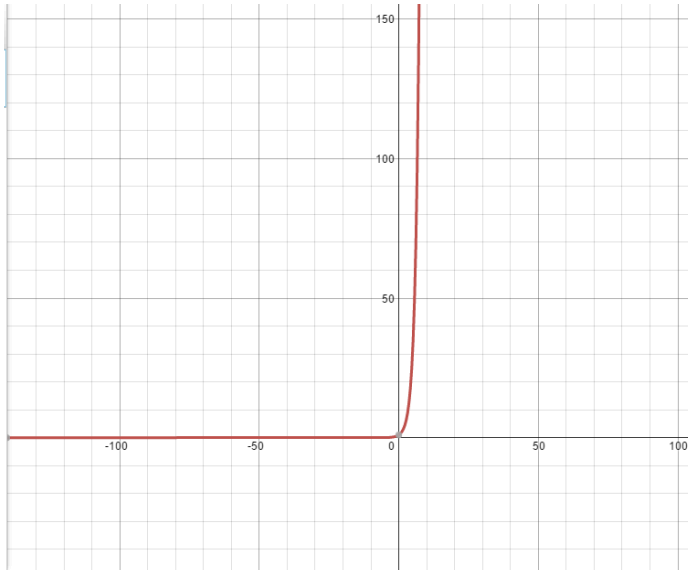
R = Growth rate

X = Time

1. f (x) = $1/3(6)^{x}$ $X = 2$ Answer: 12
2. f (n) = $10(2)^{n}$ N=5 Answer: 320
3. f (n) = $10(2)^{n}$ N = -2 Answer: 5/2
4. g(x) = $1/5(1/3)^{x}$ X = 3 Answer:1/135

How to solve with Calculator

- Hit 2nd then Y =
- Plug in equation
- Hit 2nd then table
- BAM answers 10/10 ign



$f(x) = 2^{x}$

Passing through Equations

Ex: An exponential functions form $Y = a(b)^{x}$ passes through points (2, 36) and (5, 121.5)

$5,\ 121.5 \rightarrow 121.5 = a \cdot b^{5}$

$2, 36 \rightarrow 36 = a \cdot b^{2}$

$121.5 = \left[a \cdot b^{2}\right] \cdot b^{3}$

$121.5 = 36 \cdot b^{3}$

Divide 121.5 by 36

$3.375 = b^{3}$

Cube root of 3.375 because of b^{3}

$Y = a(1.5)^{x}$

Plug in the other pair $(2, 36)$ since this equation is set equal to $(5, 121, 5)$

$36 = a(1.5)^{2}$

$36 = a(2.25)$

36 divided by 2.25

Solution:$Y = 16(1.5)^{x}$

Common Base Method

You can solve equations by way of the common base method by writing each side of the equation using a common base

Find a Common base between each number

Ex: $2^x = 16$

$2^x = 2^4$

$X = 4$

Ex. 2: $3^x = 27$

$3^x = 3^3$

$X = 3$

Ex. 3: $64^x = 16$

$(4^3)^x = 4^2$

$4^{3x} = 4^2$

<u>Practice Problems</u>

1. $8^{3x-4} = 8^{5x-10}$

2. If Billy has a car that costs 25,000 and depreciates annually by 29%, what will be its value after 12 years?

3. What axis does the equation of $f(x) = 2^x$ lie on?

a.) y-axis

b.) x-axis

c.) neither axis

d.) both axis

4. If there is the function, $f(x) = 7^x$, what values of x will be greater or equal to 1?

a. $X<0$

b. $X \leq 0$

c. $X \geq 0$

d. $X > 0$

5. Please solve the equation of a line of which its points intersect at 2,24 and 4, 138

6. Please solve the expression $9^{2x-1} = 27$ by finding a common base

7. If a population of Japanese Giant Hornets amounting at 7,000 is growing at 5% a year, what will the population be after 20 years?

8. Please solve if an exponential function form passes through two points of 5, 105 and 8, 204

9. Please solve for the expression $(3^{1})^{2x-5} = 3^{2}$

Extra Info on Exponential Function
https://www.youtube.com/watch?v=PEtIQqvIoGU