

Mar 20-1:29 PM

THE BASIC EXPONENTIAL FUNCTION

$y = x^2$ $y = c^x$

where "c" is a positive real number but is never = 1

| | | | | |
|---|-------------|----------------|----------------|-----|
| | +1 | +1 | +1 | |
| 0 | 1 | 2 | 3 | ... |
| 1 | c | c ² | c ³ | ... |
| | × c × c × c | | | |

This situation describes exponentially increasing and decreasing situations.

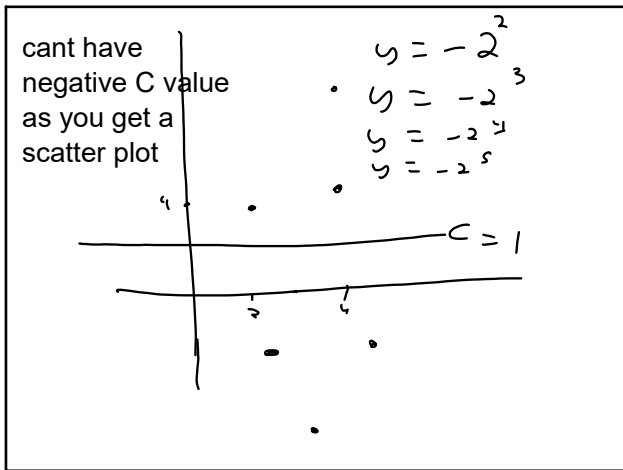
For $c > 1$ (increasing)

Notice that the function increases (or grows) at an ever increasing rate as the x value is increased

For $0 < c < 1$ (decreasing)

Notice that the function decreases (or decays) at an ever decreasing rate as the x value is increased

Mar 12-1:19 PM



Mar 20-1:54 PM

BASIC EXPONENTIAL FUNCTION

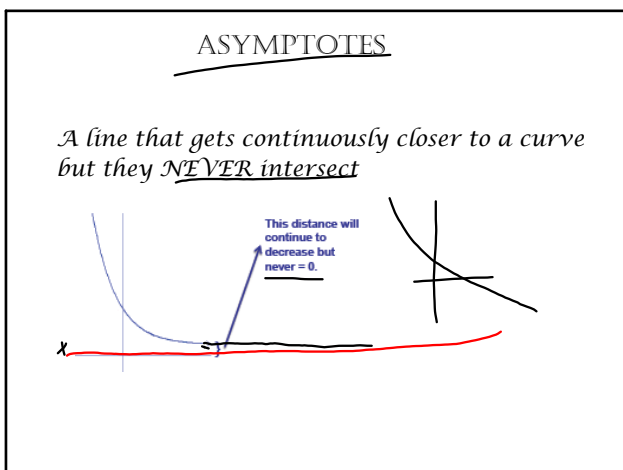
Any exponential function in the form $y = c^x$ passes through point (0,1)

Remember exponent laws: $r^0 = 1$

Therefore the y-intercept of the basic exponential is always 1

$x = 0$
 $y = 1$
 $y = 2^0$

Mar 12-1:28 PM



Mar 12-1:38 PM

FINDING THE RULE

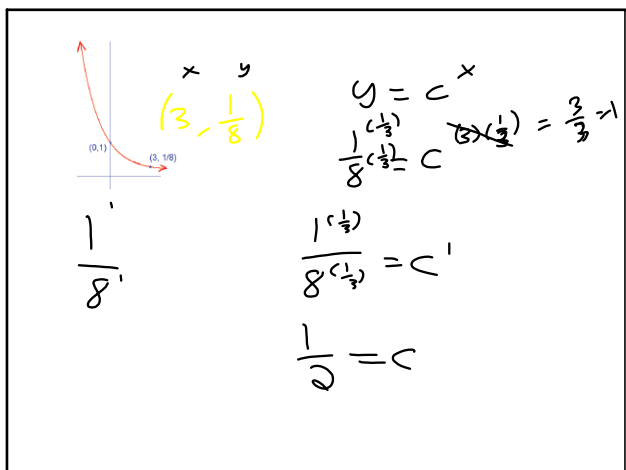
Steps:

1. Find a point on the line (other than (0,1))
2. Input x and y values into rule
3. Solve for "c"

$y = c^x$

$\sqrt{25} = \sqrt{c^2}$
 $5 = c$

Mar 12-2:03 PM



Mar 12-2:07 PM

$\frac{1}{8} = c^{\frac{1}{3}}$
 $\frac{1}{8} = c^{\frac{1}{3}}$
 $\frac{1}{2} = c$

Mar 20-2:16 PM

Determine the rule of each exponential function below:

$A(2, 9)$
 $y = c^x$
 $9 = c^2$
 $3 = c$

$A(-\frac{1}{3}, \frac{1}{2})$

$A(\frac{1}{2}, 2)$
 $y = c^x$
 $2 = c^{\frac{1}{2}}$
 $4 = c \rightarrow y = 4^x$

Mar 12-2:07 PM

$c > 1 \uparrow$
 $0 < c < 1 \downarrow$
 $c \neq 1 \perp$
 $c \neq -$

Mar 20-2:24 PM

$y = c^x = \text{Basic } \frac{1}{2}$

$y = c^x$
 $7 = c^4$
 $7^{\frac{1}{4}} = c$
 $1.6 = c$

Mar 21-1:33 PM

$y = c^x$
 $125 = c^{-3}$
 $125 = c^{\frac{1}{3}}$
 $0.2 = c$
 $y = 0.2^x$

Mar 21-2:12 PM

Handwritten notes on a whiteboard:

- General exponential function: $y = c^x$
- Specific function: $h(x) = \left(\frac{1}{3}\right)^x = c^x$
- A graph of an exponential decay curve, showing a curve that starts high on the y-axis and decreases as x increases, approaching the x-axis as a horizontal asymptote.

Mar 21-2:23 PM