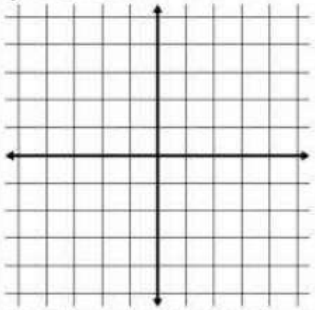
Sketch a graph of the following functions

$y = 2 \cdot 0.4^x$



1) Determine the domain and range

D: $(-\infty, \infty)$

2) Is the function even, odd or undefined for $x < 0$? ? or neither

3) Intervals of Increase or Decrease

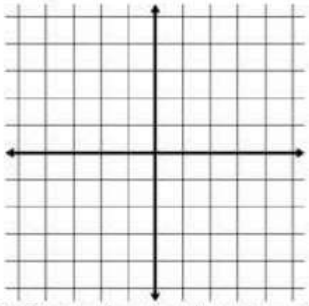
4) Find any extrema.

5) Determine the end behavior

6) Find any asymptotes

7) Intervals of Concavity

$y = 3e^{-x}$



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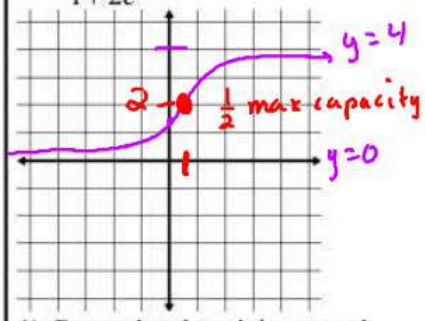
concave up
$(-\infty, .693)$
down
$(.693, \infty)$

Sketch a graph of the following functions

$$y = \frac{4}{1+2e^{-x}}$$



1) Determine the minimum and Maximum capacity (Horizontal Asy)

2) Determine the y-intercept

3) Determine the domain and range

4) Intervals of Increase or Decrease

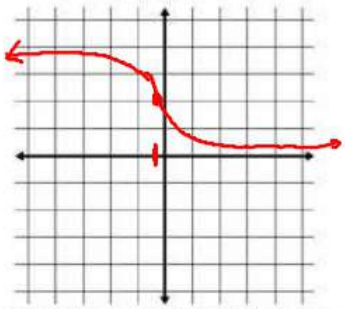
5) Determine the end behavior

6) Find any asymptotes

7) Determine Half the max capacity

8) Intervals of Concavity

$$y = \frac{4}{1+2e^{x}}$$



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What you'll Learn About

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Changing between Logarithmic and exponential form:

If $x > 0$, $b > 0$ and $b \neq 1$, then $y = \log_b x$ if and only if $b^y = x$

Properties:

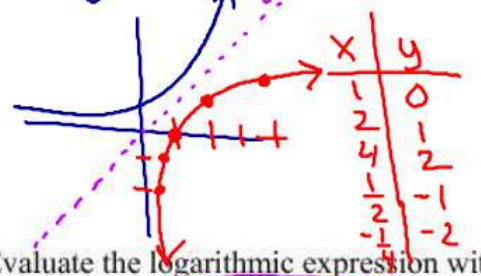
If $x > 0$, $b > 0$ $b \neq 1$, and any real number y

- $\log_b 1 = 0$ because $b^0 = 1$
- $\log_b b = 1$ because $b^1 = b$
- $\log_b b^y = y$ because $b^y = b^y$
- $b^{\log_b x} = x$ because $\log_b x = \log_b y$

Find the inverse function for $y = 2^x$

$y = 2^x$ Inverse $x = 2^y$

$y = \log_2 x$



Evaluate the logarithmic expression without using a calculator

Finding the power

a) $\log_2 8 = 3$

$\log_2 8 = y$

$2^y = 8$

b) $\log_3 \sqrt{3} =$ $y = \frac{1}{2}$

$\log_3 (3^{1/2}) = y$

$3^y = 3^{1/2}$

c) $\log_5 \frac{1}{25} = -2$

$\log_5 \frac{1}{25} = y$

5 to what power is $\frac{1}{25}$ ← $5^y = \frac{1}{25}$ $y = -2$

d) $\log_4 1 = 0$

$\log_4 1 = y$

$4^y = 1$

$y = 0$

e) $\log_7 7 = 1$

$7^y = 7$

$y = 1$

$\log_e x = \ln x$

Evaluate the logarithmic expression without using a calculator

a) $\log 100 =$

$\log_{10} 100 = y$ (y=2)

$10^y = 100$

b) $\log \sqrt[5]{10} =$

$\log_{10} 10^{1/5} = \frac{1}{5}$

$10^y = 10^{1/5}$

c) $\log \frac{1}{100} = -2$

$\log_{10} \frac{1}{100} = y$

$10^y = \frac{1}{100}$

$\log_{10} 10^{-2}$

$10^y = 10^{-2}$

d) $\ln \sqrt{e} =$

Natural log of $\sqrt{e}$

$\ln_e \sqrt{e} = y$ $e^y = e^{1/2}$ $y = \frac{1}{2}$

e) $\ln e^5 =$

$\ln_e e^5 = 5$

f) $\ln \sqrt[5]{e} =$

$\ln \sqrt[5]{e} = \frac{1}{5}$

Evaluate the logarithmic expression without using a calculator

a) $6^{\log_6 11} =$

$6^{\log_6 11} = 11$

b) $10^{\log 6} =$

$10^{\log_{10} 6} = 6$

$\log_6 11$

$6^y = 11$

c) $e^{\ln 4} =$

$e^{\ln_e 4} = 4$

Use a calculator to evaluate the logarithmic expression if it is defined and check your result by evaluating the corresponding exponential expression

a) log 34.5 = 1.537

$10^{1.537} = 34.5$

b) log 0.43 =

c) log (-3) =

No Solution

$10^{y} = -3$

you can't take logarithms of 0 and neg #'s

d) ln 23.5 = 3.157

$e^{3.157} = 23.5$

e) ln 0.48 =

f) ln(-5) =

No Solution

Solve the equation

a) log x = 3

$\log_{10} x = 3$

$10^3 = x$

$1000 = x$

b) $\log_2 x = 5$

$\log_2 x = 5$

$2^5 = x$

$32 = x$