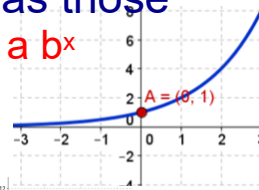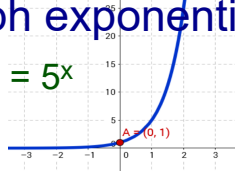## 4.1 Exponential Functions

GOALS:
1. Recognize exponential equations as those with variables in exponents. $f(x) = a\,b^x$

    $y = 2^x$
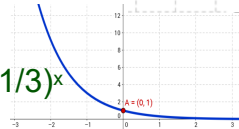
2. Graph exponential equations.

    $f(x) = 5^x$

    $f(x) = (1/3)^x$

3. Recognize applications such as compound interest.

    n periods per year

    $$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

    continuously

    $$A = P\,e^{rt}$$

Exponential Functions

Class Notes: Prof. G. Battaly, Westchester Community College, NY

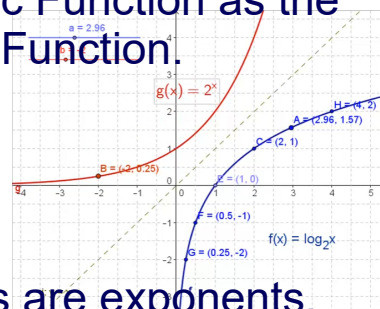Parabolas

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Homework

4.2 Logarithmic Functions

GOALS:
1. Understand the Logarithmic Function as the inverse of the Exponential Function.

    $g(x) = 2^x$

    $a = 2.96$

    $g(x) = 2^x$

    $H = (4, 2)$
    $A = (2.96, 1.57)$
    $C = (2, 1)$
    $B = (-2, 0.25)$
    $E = (1, 0)$
    $F = (0.5, -1)$
    $f(x) = \log_2 x$
    $G = (0.25, -2)$

    $f(x) = \log_2 x$

2. Understand that logarithms are exponents.

    The log is the exponent.

    exponential   logarithmic

    $b^2 = 100$ $\log_b 100 = 2$

3. Convert from exponential to logarithmic form and from logarithmic to exponential form.

    $2^5 = x$ $3 = \log_b 27$

    $\log_2 x = 5$ $b^3 = 27$

4. Evaluate logarithms of numerals.

    $\log_6 36$ $\log (100)$ $\log_3 3$

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Inverse Function Video

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Homework

4.3 Properties of Logarithms
GOALS:

1. Learn and understand Properties of Logarithms

  1. $\log_b (1) = 0$ 2. $\log_b (b) = 1$ 3. $\log_b (MN) = \log_b(M) + \log_b(N)$

  4. $\log_b \dfrac{M}{N} = \log_b(M) - \log_b(N)$ 5. $\log_b M^n = n \log_b(M)$

2. Understand the relationship between the Properties of Exponents and the Properties of Logs

3. Use Properties of Logs to expand logarithmic expressions. $\log (10000x) = \log 10^4 + \log x = 4 + \log x$

$$\log \frac{xy}{z} = \log x + \log y - \log z$$

4. Use Properties of Logs to rewrite expanded logarithms as a single logarithm.

$$2 \ln x - \tfrac{1}{2} \ln y = \ln \frac{x^2}{\sqrt{y}}$$

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4.4 Exponential & Logarithmic Equations
GOALS:

1. Solve Exponential Equations by:
  a) Rewriting in exponential form
        eg: $2^x = 32$ then $2^x = 2^5$ and $x = 5$.
  b) Converting to logarithmic form
        eg: $10^x = 8.06$ then $\log 8.06 = x$
  c) Find the log of both members of the equation
        eg: $10^x = 8.06 \longrightarrow \log 10^x = \log 8.06$
                            $x \log 10 = \log 8.06$ or $x = \log 8.06$

2. Solve Logarithmic Equations by:
  a) Converting to exponential form
        eg: $\log_5 x = 3$ then $5^3 = x$ and $x = 125$
  b) Using properties of logarithms
$\log (5x+1) = \log (2x+3) + \log 2 \longrightarrow \log (5x+1) = \log [2(2x+3)]$ $5x+1 = 4x+6$ $x = 5$
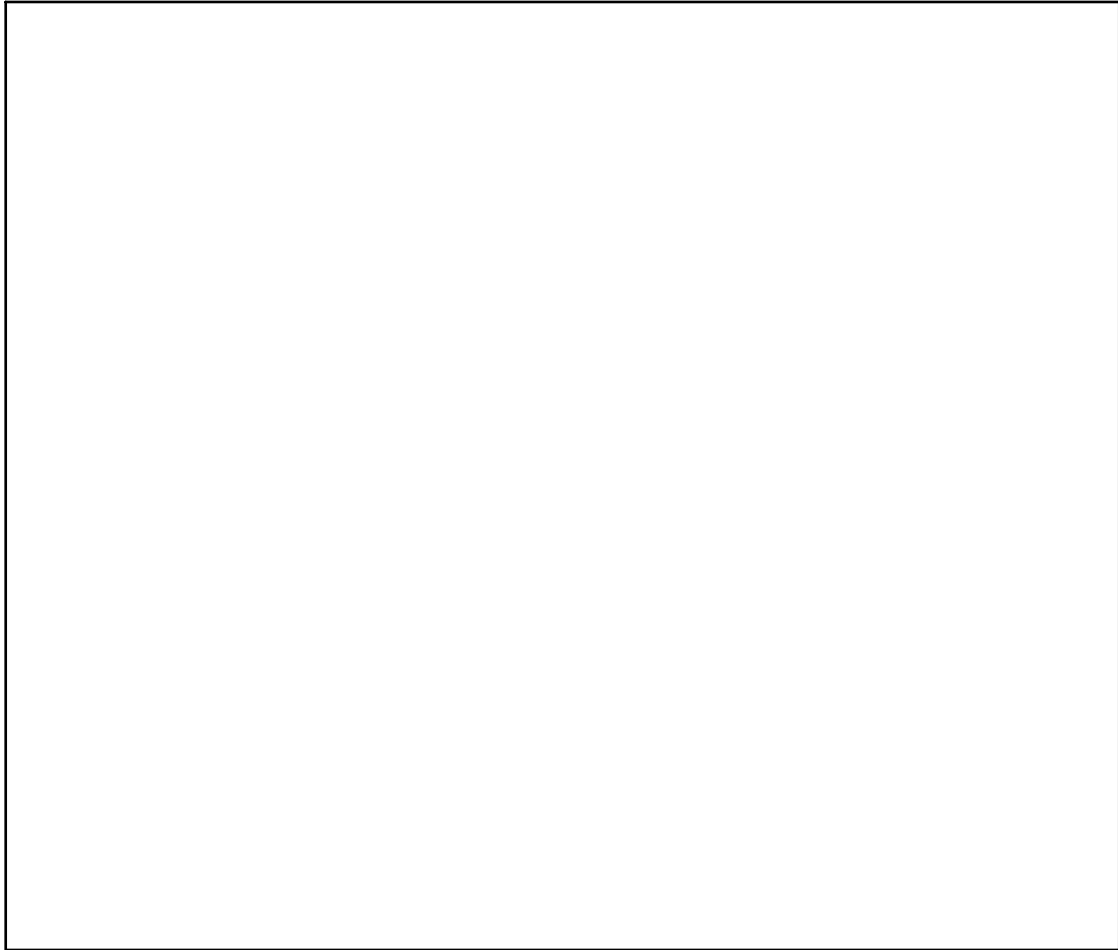 c) Checking solution to be sure it is in the
      domain of the function. $y = \log_b x$ $x > 0,\ b > 0,\ b \neq 1$

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Attachments

slope_intercept.mp4

InverseFunctionBase2.mp4