Math 1090 ~ Business Algebra

Section 4.3 Logarithmic Functions

Objectives:
- Identify the logarithmic function as the inverse of an exponential function.
- Translate between exponential and logarithmic form.
- Determine the domain of a logarithmic function.
- Sketch transformations of a logarithmic function.

For $a > 0$, $a \neq 1$, the logarithmic function $y = \log_a x$ has domain $x > 0$, base a and is defined by $a^y = x$.

Ex 1: Write $8 = 2^3$ in logarithmic form.

Ex 2: Rewrite $\log_3\left(\dfrac{1}{27}\right) = -3$ in exponential form.

Ex 3: Evaluate

a) $\log_5\left(\dfrac{1}{25}\right)$

b) $\log_7 49$
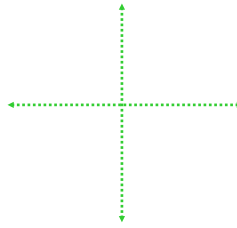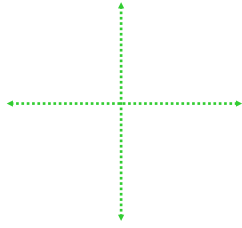
c) $\log_2\left(16^{-1}\right)$

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Ex 4: Graph and state the domain.
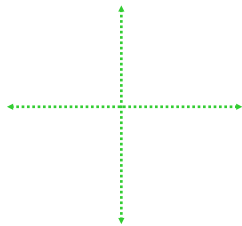
a) $y = \log x$

b) $y = -\log_3 x$

c) $y = -\log_5(x+3)$

Ex 5: Graph $y = e^x$ and $y = \ln x$. Discuss characteristics of inverse functions demonstrated by the graph.

Ex 6: Evaluate these expressions.

a) $e^{\ln 5}$

b) $\log_4 4^a$

c) $\ln e^5$

d) $9^{\log_9 11}$

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