7-3B Evaluating Logarithmic Expressions

- *evaluate logarithmic expressions without a calculator*

Evaluating Logarithmic Functions

- rewrite in exponential form: $x = b^y$
- create common bases and solve for y.

If $b^m = b^n$, $m = n$.

Evaluate.

1. $\log_3 243$

$3^? = 243$

$3^y = 3^5$

$y = 5$

5

$\log_3 243$

$\log_3 3^5$

5

2. $\log_2 \frac{1}{8}$

$2^? = \frac{1}{8}$

$2^y = \frac{1}{2^3}$

$2^y = 2^{-3}$

$\log_2 2^{-3}$

-3

3. $\log_9 3$

$9^? = 3$

$(3^2)^y = 3^1$

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

$2y = 1$

$y = \frac{1}{2}$

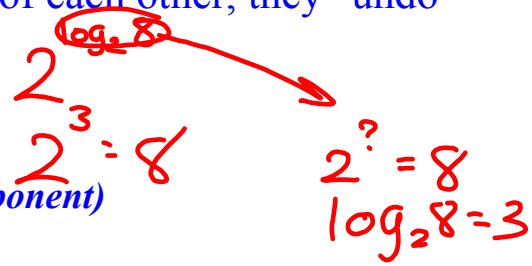
$\log_5 17$

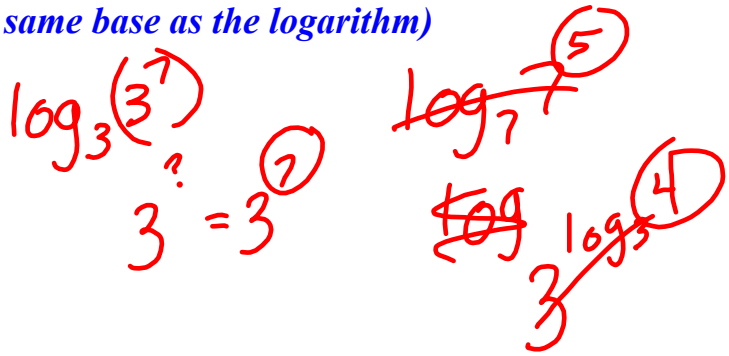
$5^? = 17$

Since $y = b^x$ and $y = \log_b x$ are inverses of each other, they "undo" each other.

- $b^{\log_b x} = x$ ex: $2^{\log_2 8} =$ 8
(an exponential written with a log as the exponent)

- $\log_b b^x = x$ ex: $\log_3 3^7 =$ 7
(a logarithm of a power with same base as the logarithm)





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