Reminder of Important Properties

- *One-to-One Properties:* $a^x = a^y$ if and only if $x = y$.

  $\log_a x = \log_a y$ if and only if $x = y$.

- *Inverse Properties:* $a^{\log_a x} = x$

  $\log_a a^x = x$

Solving Strategies

1. Rewrite the original equation in a form that allows for the use of the one-to-one properties of exponential or logarithmic functions.
2. Rewrite an exponential equation in logarithmic form, then apply the Inverse Property of logarithmic functions.
3. Rewrite a logarithmic equation in exponential form, then apply the Inverse Property of exponential functions.

Examples

Solve the following exponential equations and approximate to three decimal places (if needed).

1. $4^x = 72$

2. $3\left(2^x\right) = 42$

3. $e^x + 5 = 60$

4. $2\left(3^{2t-5}\right) - 4 = 11$

Solving Exponential & Logarithmic Equations

5. $e^{2x} - 3e^x + 2 = 0$

Examples:

Solve the following logarithmic equations and approximate to three decimal places (if needed).

1. $\ln x = 2$

2. $\log_3(5x - 1) = \log_3(x + 7)$

3. $5 + 2\ln x = 4$

4. $2\log_5 3x = 4$

Checking for extraneous roots….

5. $\log 5x + \log(x - 1) = 2$

HW: p. 253-4 #9, 15, 19, 29, 35, 37, 45, 49, 53, 59, 77, 81, 85, 93, 110