

16-3

Solving Logs & Exponentials

Change of Base Formula:

$$\log_a x = \frac{\log x}{\log a}$$

So: $\log_3 7 = \frac{\log 7}{\log 3} \approx 1.771$

Calculator: $\log(7)/\log(3)$
or Alpha, F2, 5Solving Log or Exp:

- 1) Isolate the base
- 2) Try to get the bases to match
- 3) If not, rewrite $\log \Leftrightarrow \exp$
- 4) CHECK THE ANSWERS (some are extraneous)

1) $8^x = 23$

$$\log_8 23 = x$$

$$1.508 \approx x$$

(use store to \checkmark)

2) $e^x = 72$

$$x = \ln 72$$

$$x \approx 4.277$$

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

$$3e^{.5x} = 3$$

$$e^{.5x} = 1$$

$$.5x = \ln 1$$

$$.5x = 0$$

$$x = 0$$

4) $\log_6 36 = x$

$$6^x = 36$$

$$6^x = 6^2$$

$$x = 2$$

5) $2 \log_5 (3x) = 4$

$$\log_5 (3x) = 2$$

$$5^2 = 3x$$

$$25 = 3x$$

$$\frac{25}{3} = x$$

6) $5 + 2 \ln x = 4$

$$2 \ln x = -1$$

$$\ln x = -\frac{1}{2}$$

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

$$x \approx .607$$

7) $\log x + \log (x+3) = 1$

$$\log x (x+3) = 1$$

$$x(x+3) = 10^1$$

$$x^2 + 3x = 10$$

$$x^2 + 3x - 10 = 0$$

$$(x+5)(x-2) = 0$$

$$x \neq -5, \boxed{x=2}$$

8) $\log x - \log (x+3) = 1$

$$\log \frac{x}{x+3} = 1$$

$$\frac{x}{x+3} = 10^1$$

$$x = 10(x+3)$$

$$x = 10x + 30$$

$$-9x = 30$$

$$x \neq \frac{10}{3}$$

No solution

CW/HW - Worksheet 9.3

AND CHECK