## Sec 8-5: Solving Logarithmic and Exponential Functions

**Exponential Eq's:**
- Isolate the exponential
- Rewrite as a logarithm
- Solve.

**Logarithmic Eq's:**
- Use properties of Logarithms to write as a single logarithm.
- Isolate the logarithm
- Rewrite as an exponential
- Solve.

Solve each:

1. $\log_9 (x + 7) = 0.5$

$9^{1/2} = x+7$

$3 = x+7$

$-4 = x$

2. $4 \cdot \log_4 2x + 5 = 17$

$\log_4 2x = 3$

$4^3 = 2x$

$64 = 2x$

$x = 32$

3. $54^{x-3} + 8 = 17$

$54^{x-3} = 9$

$\log_{54} 9 = x-3$

$0.55 = x-3$

$x = 3.55$

4. $\log_5 2x + \log_5 4 = 3$

$\log_5 2x \cdot 4 = 3$

$\log_5 8x = 3$

$5^3 = 8x$

$125 = 8x$

$15.625 = x$

3. $\log x - \log(x + 3) = 2$

$\log \frac{x}{x+3} = 2$

NO SOL

$\frac{10^2}{1} = \frac{x}{x+3}$

$x = 100(x+3)$

$x = 100x + 300$

$-100x \quad -100x$

$-99x = 300$

$x = -3.03$

4. $2\log x^2 - \log(x+2) = 0$

$\log \frac{x^2}{x+2} = 0$

$\frac{1}{1} = \frac{x^2}{x+2}$

$x+2 = x^2$

$0 = x^2 - x - 2$

$0 = (x+1)(x-2)$

$x = 2$ ~~$x = -1$~~