Logarithmic Equations

2 Types of Equations:

A) log on one side – Use definition
B) log on both sides – drop log notation

Procedure – write as single logs, then choose Type A or B

Example: **Solve for x:** $\log_7(x+1) + \log_7(x-5) = 1$

$\log_7(x+1)(x-5) = 1$

$(x+1)(x-5) = 7^1$

$x^2 - 4x - 5 = 7$

$x^2 - 4x - 12 = 0$

$(x-6)(x+2) = 0$, so $x = 6$ or $x = -2$

$x \neq -2$, so $x = 6$

Solve the following problems. *Check your domain!*

1. $\log_5 (x + 10) + \log_5 (x - 10) = 3$

2. $\log_2 (x + 4)(x - 3) = 3$

3. $\log_3 (3x + 3)(x + 3) = 2$

4. $\ln (7 - x) + \ln (-4 - x) = \ln (2 - 4x)$

5. $\log_4 (x^2 - 9) - \log_4 (x + 3) = 1$

6. $\log_3 (2x - 9) + \log_3 (x + 1) = 1$