Warm-up: Solving Exponentials and Logarithms

1. $6 \cdot (2)^{x+3} - 10 = 25$

$6(2)^{x+3} = 35$

$2^{x+3} = \frac{35}{6}$

$(x+3)\log 2 = \log\left(\frac{35}{6}\right)$

$x+3 = \frac{\log\frac{35}{6}}{\log 2}$

$x = \frac{\log\frac{35}{6}}{\log 2} - 3$ $\quad x = -.456$

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

$\log_3 9 \quad \log_3 3$

$2 \quad - \quad 1$

$\log_3\left(\frac{x}{x-6}\right) = 1$

$3^1 = \frac{x}{x-6}$

$3x - 18 = x$

$2x = 18$

$x = 9$

3. You are going to invest $2500 in a bank account that compounds interest continuously at a rate of 3.5% per year. How long will it take until the account has $4000?

$y = 2500e^{.035t}$

$4000 = 2500e^{.035t}$

$1.6 = e^{.035t}$

$\ln 1.6 = .035t$

$13.429 = t$

4. $\log(x+5) + \log(x) = \log(66)$

$\log_{10}(x^2+5x) = \log_{10} 66$

$x^2 + 5x = 66$

$x^2 + 5x - 66 = 0$

$(x+11)(x-6) = 0$

$x = -11 \quad x = 6$

Only 6 works