Pre-Calculus **HW#3.4-3** **Name:** Key

Solve each equation. Check for extraneous answers.

1. $5^{x^2-12} = 25^{2x}$

$5^{x^2-12} = (5^2)^{2x}$

$x^2 - 12 = 4x$

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

$(x-6)(x+2) = 0$

$\boxed{x = 6,\ x = -2}$

2. $5^{2x} \cdot 5^{4x} = 125$

$5^{6x} = 5^3$

$6x = 3$

$\boxed{x = \frac{1}{2}}$

3. $3^{x+2} \cdot 3^x = 81$

$3^{2x+2} = 3^4$

$2x + 2 = 4$

$2x = 2$

$\boxed{x = 1}$

4. $2|\ln x| - 6 = 0$

$|\ln x| = 3$

$\ln x = 3$ or $\ln x = -3$

$e^3 = x$ $\quad e^{-3} = x$

$\boxed{x = 20.09,\ .05}$

5. $3|\log x| - 6 = 0$

$|\log x| = 2$

$\log x = 2$ or $\log x = -2$

$10^2 = x$ or $10^{-2} = x$

$\boxed{x = 100,\ \frac{1}{100}}$

6. $3^{x^2} = 45$

$\log_3 45 = x^2$

$3.46 = x^2$

$\boxed{x = \pm 1.86}$

7. $\log_2(x-1) - \log_2(x+3) = \log_2\left(\frac{1}{x}\right)$

$\log_2 \frac{(x-1)}{(x+3)} = \log_2 \left(\frac{1}{x}\right)$

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

$x^2 - x = x + 3$

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

$(x-3)(x+1) = 0$

$\boxed{x = 3}$ or $x = -1$

8. $\ln(2x+1) + \ln(x-3) - 2\ln x = 0$

$\ln \frac{(2x+1)(x-3)}{x^2} = 0$

$e^0 = \frac{(2x+1)(x-3)}{x^2}$

$1 = \frac{2x^2 - 5x - 3}{x^2}$

$x^2 = 2x^2 - 5x - 3$

$0 = x^2 - 5x - 3$

$(x \quad)(x \quad) = 0$ nope!

$x = \frac{5 \pm \sqrt{25 - 4 \cdot 1(-3)}}{2}$

$x = \frac{5 \pm \sqrt{37}}{2}$

$\boxed{x = 5.54}$ or $x = -.54$