WORKSHEET 13

Warm-up Problems

Solve each of the following equations

1. $2^x = 8$
2. $\log_2 x = -3$
3. $\ln e^x = 5$

Real Problems

Solve each of the following equations

1. $4^{1-2x} = 2$
2. $5^x = 3^{x+2}$
3. $3^{2x} + 3^{x+1} - 4 = 0$
4. $\log_x 64 = -3$
5. $\log_6(x+3) + \log_6(x+4) = 1$

Challenge Problems

1. Solve $\log_2(x+1) - \log_4 x = 1$. (*Hint:* Change $\log_4 x$ to base 2).
2. Solve $\log_2 x^{\log_2 x} = 4$.
3. Fill in reasons for each step in the following two solutions.

   Solve: $\log_3(x-1)^2 = 2$

Solution A	**Solution B**
$\log_3(x-1)^2 = 2$	$\log_3(x-1)^2 = 2$
$(x-1)^2 = 3^2 = 9$_____	$2\log_3(x-1) = 2$_____
$(x-1) = \pm 3$_____	$\log_3(x-1) = 1$_____
$x-1 = -3$ or $x-1 = 3$_____	$x-1 = 3^1 = 3$_____
$x = -2$ or $x = 4$_____	$x = 4$_____

   Both solutions given in Solution A check (can you see why?). Explain what caused the solution $x = -2$ to be lost in Solution B.