Name: _____*key*_____

Period: _____

Solve for x.

1. $25^{(5+x)} = \left(\dfrac{1}{125}\right)^{2x+7}$ $\Rightarrow (5)^{2(5+x)} = (5)^{-3(2x+7)}$

$\Rightarrow 10 + 2x = -6x - 21 \Rightarrow 8x = -31 \Rightarrow \boxed{x = \dfrac{-31}{8}}$

2. $5(5^x) + 5(5^{-x}) = 26$

$5 \cdot (5^x)^2 + 5 = 26(5^x)$

$5 \cdot (5^x)^2 - 26(5^x) + 5 = 0 \Rightarrow (5 \cdot 5^x - 1)(5^x - 5) = 0$

$\dfrac{5 \cdot 5^x}{5^x} \quad -1 \quad -5$

$5^x = \dfrac{1}{5} \quad \boxed{x = -1} \qquad 5^x = 5 \quad \boxed{x = 1}$

3. $3^{2x} - 3(3^{x-1}) = 72$

$(3^x)^2 - \dfrac{3}{3} \cdot 3^x = 72 \Rightarrow (3^x + 8)(3^x - 9) = 0$

$(3^x)^2 - 3^x - 72 = 0 \qquad 3^x = -8 \qquad 3^x = 9 \quad \boxed{x = 2}$

4. Factor $3^{2x} - 3(3^{x+1}) + 14$

$(3^x)^2 - 3 \cdot 3(3^x) + 14 \Rightarrow (3^x)^2 - 9(3^x) + 14$

$\Rightarrow \boxed{(3^x - 7)(3^x - 2)}$

5. Factor $4^{2x+2} - 121$

$(4^{x+1})^2 - (11)^2 = \boxed{[4^{x+1} - 11][4^{x+1} + 11]}$ OR $16\left(4^x - \dfrac{11}{4}\right)\left(4^x + \dfrac{11}{4}\right)$

6. Simplify $\dfrac{16^n - 40(8^{n-1})}{8^n}$

$= \dfrac{2^n \cdot 8^n - (40)(8^n \cdot 8^{-1})}{8^n} = \left(2^n - \dfrac{40}{8}\right) \Rightarrow \boxed{2^n - 5}$

Notes: To prepare for the quiz, go over the exit slip #1, the review sets, and the exit slip #2.and IB questions.