Math 1010 March 20, 2017 Homework 23

Solve each equation for x. The technique will be:

A) Take the log of both sides for the equation $2^{3x+1} = 5$

$$\begin{aligned} \ln\left(2^{3x+1}\right) &= \ln 5 \\ (3x+1)\ln 2 &= \ln 5 \\ (3x+1).6931 &= 1.6095 \\ 2.0794x + .6931 &= 1.6095 \\ 2.0794x &= .9164 \\ x &= .4407 \end{aligned}$$

B) Use properties of logs to combine, then exponentiate for $\log_2(x+2) = 3 - \log_2 4x$

$$\begin{aligned} \log_2(x+2) + \log_2 5 &= 3 \\ \log_2(x+2)5 &= 3 \\ 2^{\log_2(x+2)5} &= 2^3 \\ 5x + 2 &= 8 \\ 5x &= 6 \\ x &= \frac{6}{5} \end{aligned}$$

1. $3^x = 7$

2. $5^{2x+7} = 41$

3. $2^{7x+1} = 5^{3x}$

4. $104.23 = 2^{2.35x}$

5. $\log_3(x-8) = 2 - \log_3 x$
   (HINT: Move the $\log_3$ expressions to one side, combine, then exponentiate both sides with base 3.)