

1. What is the solution to  $5^x = 2^{x+1}$ ? Explain your work and check your solution.

$$5^x = 2^{x+1}$$

Write the original equation.

$$\log(5^x) = \log(2^{x+1})$$

Power Property of Logarithms

$$x \log(5) = x \log 2 + \log 2$$

Subtract  $x \log 2$  from both sides.

$$x \log 5 - x \log 2 = \log 2$$

Factor out  $x$ .

$$x = \frac{\log 2}{\log 5 - \log 2}$$

Use a calculator.

Check Substitute \_\_\_\_\_ into the equation:

$$5^x = 5 \approx \underline{\hspace{2cm}}$$

$$2^{x+1} = 2 \approx \underline{\hspace{2cm}}$$

Solve the following logarithmic and Exponential Equations

2.  $\log_4(x + 1) = \log_4(3x - 5)$

3.  $\ln(2x + 3) = \ln(-2x + 7)$

4.  $\log_5(x^2 - x) = \log_5(2x - 2)$

5.  $\ln(x^2 - 4x) = \ln(-4x + 25)$

6.  $5^{x-3} = 10$

7.  $4^x = 6^{x+2}$

Solve the equations below by using a graphing calculator to find the point(s) of intersection.

8.  $\ln(3x + 4) = 2x - 5$

9.  $\ln(5x) = x^2$

Solve the following equation by graphing. And then verify your answer by using a graphing calculator.

10.  $4(2)^x = 4 - x$

