Exponential and Logarithmic Equations

1. Solve each exponential equation by expressing each side as a power of the same base and then equating exponents

$$2^x = 16$$

2. Solve each exponential equation by expressing each side as a power of the same base and then equating exponents

$$3^{5x-1} = 9$$

3. Solve each exponential equation by expressing each side as a power of the same base and then equating exponents

$$9^{x+2} = 27$$

4. Solve each exponential equation by expressing each side as a power of the same base and then equating exponents

$$5^x = \frac{1}{\sqrt[4]{5}}$$

5. Solve each exponential equation by expressing each side as a power of the same base and then equating exponents

$$16^{x-2} = 8^{3x-1}$$

6. Solve each exponential equation. Express the solution set in terms of natural logarithms. Then use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution

$$15^{x} = 112$$

7. Solve each exponential equation. Express the solution set in terms of natural logarithms. Then use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution

$$e^{7x-1} - 5 = 53$$

8. Solve each exponential equation. Express the solution set in terms of natural logarithms. Then use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution

$$4^{x-7} = 13$$

9. Solve each exponential equation. Express the solution set in terms of natural logarithms. Then use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution

$$2^{8x-1} = 3^{x-4}$$

10. Solve each exponential equation. Express the solution set in terms of natural logarithms. Then use a calculator to obtain a decimal approximation, correct to two decimal places, for the solution

$$e^{4x} - 8e^{2x} - 20 = 0$$

11. Solve each logarithmic equation. Be sure to reject any value of x that is not in the domain of the original log expressions. Give the exact answer. Then, where necessary, use a calculator to obtain a decimal approximation correct to 2 decimal places

$$\log_4(x-5) = 3$$

12. Solve each logarithmic equation. Be sure to reject any value of x that is not in the domain of the original log expressions. Give the exact answer. Then, where necessary, use a calculator to obtain a decimal approximation correct to 2 decimal places

$$5\ln(3x-1)=15$$

13. Solve each logarithmic equation. Be sure to reject any value of x that is not in the domain of the original log expressions. Give the exact answer. Then, where necessary, use a calculator to obtain a decimal approximation correct to 2 decimal places

$$\log_2 x+\log_2(x-6)=4$$

14. Solve each logarithmic equation. Be sure to reject any value of x that is not in the domain of the original log expressions. Give the exact answer. Then, where necessary, use a calculator to obtain a decimal approximation correct to 2 decimal places

$$\log_3(x-1)-\log_3(x-5)=2$$

15. Solve each logarithmic equation. Be sure to reject any value of x that is not in the domain of the original log expressions. Give the exact answer. Then, where necessary, use a calculator to obtain a decimal approximation correct to 2 decimal places

$$\log(x+1)-\log 5=\log(4x-2)$$

16. Solve each logarithmic equation. Be sure to reject any value of x that is not in the domain of the original log expressions. Give the exact answer. Then, where necessary, use a calculator to obtain a decimal approximation correct to 2 decimal places

$$\ln(x+2)-\ln(x+4)=\ln(x+7)-\ln(x+11)$$