**Solving Exponential Equations**

An ***exponential equation*** is one in which the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is contained within an exponent or exponents.

As with all types of equations, algebra can be used to determine an exact solution for an exponential equation. When the \_\_\_\_\_\_\_\_\_\_\_\_\_\_ on either side of the equation have the same base, the exponents can be set equal and the resulting equation solved.

In other words:

**Ex1.** Solve each of the following:

|  |  |
| --- | --- |
| **a)** $3^{2x}=81$ | **b)** $5^{2x-1}=\frac{1}{125}$ |
| **c)** $3^{x}=9^{x-1}$ | **d)** $4(2^{x})=32$ |
| **e)** $2^{x+2}-2^{x}=48$ | **f)** $2^{2x}-33\left(2^{x}\right)+32=0$ |

**Ex2.** Solve each of the following:

|  |  |
| --- | --- |
| **a)** $2^{x+1}+3\left(2^{x}\right)=80$ | **b)** $3^{x+5}+3^{x+4}=36$ |
| **c)** $7(2^{3x})-3=445$ | **d)** $5^{x^{2}-6x}=625^{2-x}$ |
| **e)** $5\left(3^{x^{2}-x}\right)+2=3647$ | **f)** $216^{x-4}=\sqrt{1296}$ |
| **g)** $\frac{8^{2x}}{4^{x-1}}=2^{x+1}$ |  |