

## Solving Log Equations

Solve each log equation. Be sure to check your answers.

1.  $\log_5 5x = 2$

$$5^2 = 5x$$

$$25 = 5x$$

$$5 = x$$

4.  $\ln(x+3) = 4$

$$e^4 = x+3$$

$$x = e^4 - 3$$

7.  $\log_4 5x = \log_4 2$

$$5x = 2$$

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

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

$$3x-1 = 2x+3$$

$$x = 4$$

12.  $\log_5 2 + \log_5(3x-2) = 1$

$$\log_5 6x-4 = 1$$

$$5^1 = 6x-4$$

$$9 = 6x$$

$$\frac{9}{6} = x$$

14.  $\log(x^2+16) = \log 80$

$$x^2+16=80$$

$$x^2=64$$

$$x=8 \quad -8$$

2.  $\log_3(2x-3) = 2$

$$3^2 = 2x-3$$

$$9 = 2x-3$$

$$12 = 2x$$

$$6 = x$$

5.  $\log_{25} x = \frac{3}{2}$

$$25^{\frac{3}{2}} = x$$

$$125 = x$$

8.  $\ln 4 - \ln x = \ln 3$

$$\frac{4}{x} = 3$$

$$4 = 3x$$

$$\frac{4}{3} = x$$

11.  $\log_4(4x+3) = \log_4(3x-6)$

$$4x+3 = 3x-6$$

$$x = -9$$

 $\emptyset$ 

13.  $2\log_3 6 + \frac{1}{4}\log_3 16 = \log_3 x$

$$6^2 \cdot 16^{\frac{1}{4}} = x$$

$$36 \cdot 2 = x$$

$$72 = x$$

15.  $\log_5(x^2+7) = \frac{2}{3}\log_5(64)$

$$x^2+7 = 64^{\frac{2}{3}}$$

$$x^2+7 = 16$$

$$x^2 = 9$$

$$x = 3, -3$$

3.  $2\log_4 x = 3$

$$4^3 = x^2$$

$$64 = x^2$$

$$8 = x$$

$$+8 = x$$
  
 ~~$-8 = x$~~

6.  $\ln(2x) = 6$

$$e^6 = 2x$$

$$\frac{1}{2}e^6 = x$$

$$\frac{e^6}{2} = x$$

9.  $\log_3 x = 2\log_3 3 + \log_3 5$

$$x = 3^2 \cdot 5$$

$$x = 9 \cdot 5$$

$$x = 45$$