Answer Key · Lesson 8.5: Solving Logarithmic Equations

School Launch · Algebra II · Unit 8 · Worksheet A · for the parent

Key

1. $x = 6$

Solve: $\log_3(x+3) = 2$.

2. $x = 117$

Solve: $\log_5(x+8) = 3$.

3. $x = 998$

Solve: $\log_{10}(x+2) = 3$.

4. $x = -1$

1. Exponential form: $x + 3 = 2^1 = 2$
2. $x = 2 - 3 = -1$

Solve: $\log_2(x+3) = 1$.

5. $x = -6$

1. Exponential form: $x + 9 = 3^1 = 3$
2. $x = 3 - 9 = -6$

Solve: $\log_3(x+9) = 1$.

6. $x = 2$

1. Exponential form: $x + 1 = 3^1 = 3$
2. $x = 3 - 1 = 2$

Solve: $\log_3(x+1) = 1$.

7. $x = 7$

1. Exponential form: $x + 1 = 2^3 = 8$
2. $x = 8 - 1 = 7$

Solve: $\log_2(x+1) = 3$.

8. $x = -1 + 2\sqrt{7}$

1. Product rule: $\log_3[x(x+2)] = 3$, so $x^2 + 2x - 27 = 0$
2. $x = \dfrac{-2 \pm \sqrt{112}}{2}$
3. Logs need $x > 0$: keep $x = -1 + 2\sqrt{7}$

Solve and check: $\log_3 x + \log_3(x+2) = 3$.

9. $x = \dfrac{-3 + \sqrt{109}}{2}$

1. Product rule: $\log_5[x(x+3)] = 2$, so $x^2 + 3x - 25 = 0$
2. $x = \dfrac{-3 \pm \sqrt{109}}{2}$
3. Logs need $x > 0$: keep $x = \dfrac{-3 + \sqrt{109}}{2}$

Solve and check: $\log_5 x + \log_5(x+3) = 2$.

10. $x = 1$

1. Product rule: $\log_5[x(x+4)] = 1$, so $x^2 + 4x - 5 = 0$
2. $x = \dfrac{-4 \pm \sqrt{36}}{2}$
3. Logs need $x > 0$: keep $x = 1$

Solve and check: $\log_5 x + \log_5(x+4) = 1$.