

6.6 Solving Exponential & Logarithmic Equations & Inequalities CYU

- Use when you get it right all by yourself
- S** Use when you did it all by yourself, but made a silly mistake
- H** Use when you could do it alone with a little help from teacher or peer
- G** Use when you completed the problem in a group
- X** Use when a question was attempted but wrong (get help)
- N** Use when a question was not even attempted

CONCEPTS	BASIC	INTERMEDIATE	ADVANCED
Solving Exponential Equations	1	2	3
Solving Logarithmic Equations	4, 7	5, 8	6, 9
Checking for Extraneous Solutions		1 - 9	
Solving Exponential Inequalities	10	11	12
Solving Logarithmic Inequalities	13	14	15
Real-World Application			16, 17

Solve the equation. Check for extraneous solutions. Show all work to earn full credit.

1.  $7^{3x+5} = 7^{1-x}$

$x = -1$

2.  $5^x = 33$

$x \approx 2.173$

3.  $2e^{4x} + 9 = 15$

$x \approx 0.275$

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

$x = 6$

5.  $\log_3(2x + 1) = 2$

$x = 4$

6.  $\log_6(5x + 9) = \log_6 6x$

$x = 9$

7.  $\log_2 x + \log_2(x - 2) = 3$

$x = 4$

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

$x \approx 13.22$

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

$x = -2 \frac{1}{2} - 8$



Solve the inequality. Show all work to earn full credit. Check for extraneous solutions.

10.  $9^x > 54$

11.  $4^x \leq 36$

12.  $e^{3x+4} > 11$

$x > 1.815$

$x \leq 2.585$

$x > -0.534$

13.  $\ln x \geq 3$

14.  $-3 \log_5 x + 6 \leq 9$

15.  $-4 \log_5 x - 5 \geq 3$

$x \geq 20.086$

$x \geq \frac{1}{5}$

$0 < x \leq \frac{1}{25}$

16. **PROBLEM SOLVING** You deposit \$1000 in an account that pays 3.5% annual interest compounded monthly. When is your balance at least \$1200? \$3500?

$\approx 5.22 \text{ yrs}$

$\approx 35.85 \text{ yrs}$

17. **PROBLEM SOLVING** An investment that earns a rate of return  $r$  doubles in value in  $t$  years, where  $t = \frac{\ln 2}{\ln(1+r)}$  and  $r$  is expressed as a decimal. What rates of return will double the value of an investment in less than 10 years?

$r > 0.0718$  or  $r > 7.18\%$

**CYU Reflection:** How far can you go: basic, intermediate, or advanced?

**Rate your mastery level!**

How confident are you with the skills this CYU covered? Circle the score you would give yourself.

