

Name:

Period:

Date:

Practice Worksheet: Exponential and Logarithmic Equations

Solve the exponential equation. Check for extraneous solutions. Round the result to three decimal places if necessary.

1. $5^x = 12$

$$\log_5 12 = x$$

$$\boxed{1.544 = x}$$

6. $10^{x+2} - 12 = 22$

$$10^{x+2} = 34$$

$$\log 34 = x+2$$

$$\boxed{x = -.468}$$

2. $4^x - 6 = 4$

$$4^x = 10$$

$$\log_4 10 = x$$

$$\boxed{1.661 = x}$$

7. $7^{2x-3} - 4 = 14$

$$7^{2x-3} = 18$$

$$\log_7 18 = 2x-3$$

$$1.485 = 2x-3$$

$$\boxed{x = 2.243}$$

3. $3e^{3x} = 12$

$$e^{3x} = 4$$

$$\ln 4 = 3x$$

$$\boxed{.4621 = x}$$

8. $3(2^{x+6}) = 17$

$$2^{x+6} = 5.6667$$

$$\log_2 5.6667 = x+6$$

$$\boxed{-3.497 = x}$$

4. $10^{2x-3} + 3 = 19$

$$10^{2x-3} = 16$$

$$\log 16 = 2x-3$$

$$\boxed{x = 2.102}$$

9. $4e^{3x} - 8 = -6$

$$4e^{3x} = 2$$

$$e^{3x} = .5$$

$$\ln .5 = 3x$$

$$\boxed{-.7310 = x}$$

5. $3e^x + 7 = 9$

$$3e^x = 2$$

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

$$\ln \frac{2}{3} = x$$

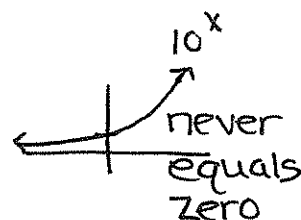
$$\boxed{-.4055 = x}$$

10. $10^{2x+1} + 2 = 2$

$$10^{2x+1} = 0$$

$$\log 0 = 2x+1$$

$$\boxed{\text{NO SOLUTION}}$$



Solve the logarithmic equation. Check for extraneous solutions. Round the result to three decimal places if necessary.

11. $7 - \log_3(8x) = 2$

$$5 = \log_3(8x)$$

$$3^5 = 8x$$

$$x = 30.375$$

16. $4 + \log_9(3x - 7) = 6$

$$\log_9(3x - 7) = 2$$

$$3x - 7 = 9^2$$

$$3x - 7 = 81$$

$$x = 29.333$$

12. $2 \log_2(1 - 2x) = 12$

$$\log_2(1 - 2x) = 6$$

$$1 - 2x = 2^6$$

$$1 - 2x = 64$$

$$-2x = 63$$

$$x = -31.5$$

17. $\log_2(2x) + \log_2 x = 5$

$$\log_2(2x^2) = 5$$

$$2x^2 = 2^5$$

$$2x^2 = 32$$

$$x^2 = 16$$

$$x = \pm 4 \rightarrow x = 4$$

Can't take log of
* Neg #. -4
DOES NOT
WORK.

13. $3 \ln x - 7 = 4$

$$3 \ln x = 11$$

$$\ln x = \frac{11}{3}$$

$$e^{\frac{11}{3}} = x$$

$$39.121 = x$$

18. $\log_6(2x - 6) + \log_6 x = 2$

$$\log_6(2x^2 - 6x) = 2$$

$$2x^2 - 6x = 6^2$$

$$2x^2 - 6x - 36 = 0$$

$$2(x^2 - 3x - 18) = 0$$

$$2(x - 6)(x + 3) = 0$$

$$x = 6 \text{ or } -3$$

19. $\ln(3x) - \ln 2 = 4$

$$\ln\left(\frac{3x}{2}\right) = 4$$

$$e^4 = \frac{3x}{2}$$

$$x = 36.4$$

15. $\log(7x) + 4 = 5$

$$\log(7x) = 1$$

$$10^1 = 7x$$

$$\frac{10}{7} = x$$

$$1.4286 = x$$

20. $3 \log_5 x - \log_5(5x) = 3 - \log_5 25$

$$\log_5 x^3 - \log_5(5x) = 3 - 2$$

$$\log_5\left(\frac{x^3}{5x}\right) = 1$$

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

$$x^2 = 25$$

$$x = \pm 5$$

$$x = 5$$