

Name: _____

<p>1. Rewrite as a log:</p> $z^4 = m$ $\log_z m = 4$	<p>2. Rewrite as a log:</p> $5^m = \frac{1}{625}$ $\log_5 \left(\frac{1}{625}\right) = m$
<p>3. Rewrite as a log:</p> $\left(\frac{1}{4}\right)^{-3} = 64$ $\log_{1/4} 64 = -3$	<p>4. Rewrite as a log:</p> $7^w = r$ $\log_7 r = w$
<p>5. Rewrite as an exponential</p> $\log_6 t = -2$ $6^{-2} = t$	<p>6. Rewrite as an exponential</p> $\log_5 \left(\frac{1}{125}\right) = h$ $5^h = \frac{1}{125}$
<p>7. Rewrite as an exponential</p> $\log_3 243 = y$ $3^y = 243$	<p>8. Rewrite as an exponential</p> $\log_p 343 = 3$ $p^3 = 343$
<p>9. Expand</p> $\log_5 7x y^3$ $\log_5 7 + \log_5 x + 3 \log_5 y$	<p>10. Expand</p> $\log_2 \frac{k^3 p}{\sqrt{t}}$ $3 \log_2 k + \log_2 p - \frac{1}{2} \log_2 t$
<p>11. Expand</p> $\log_4 \frac{3d^5}{b^4 c^3}$ $\log_4 3 + 5 \log_4 d - 4 \log_4 b - 3 \log_4 c$	<p>12. Expand</p> $\ln y^4 \sqrt[3]{y+2}$ $4 \ln y + \frac{1}{3} \ln (y+2)$
<p>13. Condense</p> $\ln 4 + 3 \ln a + 4 \ln b$ $\ln 4a^3 b^4$	<p>14. Condense</p> $\log_3 b + 2 \log_3 k + 3 \log_3 m - 5 \log_3 w$ $\log_3 \frac{b k^2 m^3}{w^5}$

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<p>15. Condense</p> $4 \ln b - \ln 7 - \ln g - 5 \ln j$ $\ln \frac{b^4}{7gj^5}$	<p>16. Condense</p> $\log_6 2 - \frac{1}{3} \log_6 (x+3) - 4 \log_6 y$ $\log_6 \frac{2}{y^4 \sqrt[3]{x+3}}$
<p>17. Solve: $2^{x+1} + 11 = 43$</p> $2^{x+1} = 32 \quad 2^5$ $x+1 = 5$ $x = 4$	<p>18. Solve: $5^{x-2} = \frac{1}{625}$</p> $5^{x-2} = 5^{-4}$ $x-2 = -4$ $x = -2$
<p>19. Solve</p> $-3(2^x) = -336$ $2^x = 112$ $x = 6.807$	<p>20. Solve</p> $\log_5 (6x+1) = \log_5 (3x+16)$ $6x+1 = 3x+16$ $3x = 15$ $x = 5$
<p>21. Solve</p> $-3e^{4x} - 7 = -40$ $-3e^{4x} = -33$ $e^{4x} = 11$ $x = .599$	<p>22. Solve</p> $11(4^{x+2}) - 18 = 1082$ $11(4^{x+2}) = 1100$ $4^{x+2} = 100$ $x = 1.322$
<p>23. Solve</p> $12 - 3 \ln(2x) = 6$ $-3 \ln(2x) = -6$ $x = 3.695$	<p>24. Solve</p> $4 \log_3 (x-3) - 21 = -9$ $4 \log_3 (x-3) = 12$ $\log_3 (x-3) = 3$ $x = 30$
<p>25. Solve</p> $\log_6 x + \log_6 (x+5) = 2$ $\log_6 x(x+5) = 2$ $x^2 + 5x = 36$ $x^2 + 5x - 36 = 0$ $x+9 \quad x-4 \quad \cancel{x+9} \quad x=4$	<p>26. Solve</p> $1296^{x-1} = 6^{x-1}$ $(6^4)^{x-1} = 6^{x-1}$ $6^{4x-4} = 6^{x-1}$ $4x-4 = x-1$ $3x = 3$ $x = 1$

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27. You purchase a car for \$27,000. The value of the car decreases 10% each year.

a. Write the equation for the car's value in terms of the number of years since the purchase.

$$A = 27000 (.90)^t$$

b. What is the value of the car after 4 years?

$$A = 17,714.70$$

c. When will the car be worth half the original value?

$$.5 = (.90)^t$$

$$t = 6.579 \text{ yrs}$$

28. The tuition at a private college in 2000 was \$19,500. During the next 10 years, the tuition increased by an average of 4% each year.

a. Write a model for the tuition at the college since 2000.

$$A = 19,500 (1.04)^t$$

b. What is the tuition in 2009 at this college?

$$A = \$27,754.58$$

c. What year will the tuition double?

$$2 = (1.04)^t$$

$$t = 17.673 \text{ yrs}$$

29. You deposit \$5100 in an account that earns 4.5% annual interest. Find the balance after 10 years if the interest is compounded:

$$A = 5100 \left(1 + \frac{.045}{n} \right)^{nt}$$

a. Semi-Annually

$$A = \$7,958.60$$

b. Quarterly

$$A = \$7,978.32$$

c. Continuously

$$A = \$7,998.39$$

d. How long would it take to double your investment if it is compounded continuously?

$$10200 = 5100 e^{.045t}$$

$$2 = e^{.045t}$$

$$t = 15.403 \text{ yrs}$$

