

Name \_\_\_\_\_

Sweet

Date \_\_\_\_\_

<p>1. Rewrite as a log: <math>5^m = \frac{1}{625}</math></p> <p><math>\log_5 \frac{1}{625} = m</math></p>	<p>2. Rewrite as an exponential</p> <p><math>\log_5 \left( \frac{1}{125} \right) = h</math> <math>5^h = \frac{1}{125}</math></p>
<p>3. Simplify <math>5^{\log_5(x-1)}</math></p> <p><math>x-1</math></p>	<p>4. Simplify <math>\log_3 9^{4x}</math> <math>\log_3 (3^2)^{4x}</math></p> <p><math>8x</math></p>
<p>5. Expand <math>\log_5 7x y^3</math></p> <p><math>\log_5 7 + \log_5 x + 3 \log_5 y</math></p>	<p>6. Expand <math>\log_2 \frac{k^3 p}{\sqrt{t}}</math></p> <p><math>3 \log_2 k + \log_2 p - \frac{1}{2} \log_2 t</math></p>
<p>7. Expand <math>\log_4 \frac{16d^5}{b^4 c^3}</math> <math>\log_4 16</math></p> <p><math>2 + 5 \log_4 d - 4 \log_4 b - 3 \log_4 c</math></p>	<p>8. Expand <math>\ln y^4 \sqrt[3]{y+2}</math></p> <p><math>4 \ln y + \frac{1}{3} \ln (y+2)</math></p>
<p>9. Condense <math>\ln 4 + 3 \ln a + 4 \ln b</math></p> <p><math>\ln 4a^3 b^4</math></p>	<p>10. Condense <math>\log_3 b + 2 \log_3 k + 3 \log_3 m - 5 \log_3 w</math></p> <p><math>\log_3 \frac{bk^2 m^3}{w^5}</math></p>
<p>11. Condense <math>4 \ln b - \ln 7 - \ln g - 5 \ln j</math></p> <p><math>\ln \frac{b^4}{7gj^5}</math></p>	<p>12. Condense <math>\log_6 2 + \log_6 y - \frac{1}{3} \log_6 (x+3) - 4 \log_6 y</math></p> <p><math>\log_6 \frac{2}{y^3 \sqrt[3]{x+3}}</math></p>
<p>For #15-16 - Use the properties of logarithms to rewrite the expressions in terms using <math>\log_3 4 \approx 1.262</math> and <math>\log_3 7 \approx 1.771</math></p>	
<p>13. <math>\log_3 16</math> <math>\log_3 4^2</math></p> <p><math>2(\log_3 4) = 2.524</math></p>	<p>14. <math>\log_3 \frac{4}{7}</math> <math>\log_3 4 - \log_3 7</math></p> <p><math>-.509</math></p>

**Solve: Show work on another sheet of paper if necessary.**

15.  $2^{x+1} + 11 = 43$

$2^{x+1} = 2^5$

$x = 4$

16.  $5^{x-2} = \frac{1}{625}$

$5^{x-2} = 5^{-4}$

$x = -2$

17.  $-3(2^x) = -336$

$2^x = 112$

$x = 6.807$

18.  $\log_5(6x+1) = \log_5(3x+16)$

$6x+1 = 3x+16$

$x = 5$

19.  $-3e^{4x} - 7 = -40$

$e^{4x} = 11$

$x = .599$

20.  $12 - 3\ln(2x) = 6$

$\ln(2x) = 2$

$x = 3.695$

21.  $4\log_3(x-3) - 21 = -9$

$\log_3(x-3) = 3$

$x = 30$

22.  $\log_6 x = 2 - \log_6(x+5)$

$\log_6 x(x+5) = 2$

$x = -9, 4$

23.  $e^{2x} - 5e^x - 6 = 0$

$(e^x - 6)(e^x + 1) = 0$

$x = 1.792$ , Not possible

24.  $\ln(x+5) = \ln(x-1) - \ln(x+1)$

$x+5 = \frac{x-1}{x+1}$

$x = -3, -2$   
No Solution

25. 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.

$A = 27,000 (.90)^t$

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

$= 27,000 (.9)^4$   $A = \$17,714.70$

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

$13,500 = 27,000 (.9)^t$

$t \approx 6.579$  years

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

a. Semi-Annually

$A = 5,100 \left(1 + \frac{.045}{2}\right)^{2(10)} = \$7,958.60$

b. Quarterly

$A = 5,100 \left(1 + \frac{.045}{4}\right)^{4(10)} = \$7,978.32$

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

$10,200 = 5,100 e^{.045t}$

$t \approx 15.403$  years

\* Look over all skills checks + practice sheets in Un. 6!