Also try P.126 #1-47 &/or P.128 #1-13 –don't forget growth/decay problems &
continuous growth problems!

1. Write in logarithmic form: $p^q = r$

2. Write in exponential form: $\log_x y = m$

3. Max invests $5000 at an interest rate of 6% per annum, compounded monthly. Which expression represents the amount of Max's investment after t years?
   a) $5000(1.06)^{12t}$
   b) $5000(1.005)^{12t}$
   c) $5000(1.06)^t$
   d) $5000(1.005)^{\frac{t}{12}}$

4. A sample of water contains 200g of pollutants. Each time the sample is passed through a filter, 20% of its pollutants are removed. Determine an expression that gives the number of grams of pollutants still in the water after it passes through five filters.
   a) $200(0.8)^4$
   b) $200(1.2)^4$
   c) $200(0.8)^5$
   d) $200(1.2)^5$

5. The expression $\log_5\left(\dfrac{25x^2}{125y^3}\right)$ is the same as:
   a) $\log_5 x^2 + \log_5 y^3 - 1$
   b) $\log_5 x^2 - \log_5 y^3 - 1$
   c) $\log_5 x^2 + \log_5 y^3 + 5$
   d) $\log_5 x^2 - \log_5 y^3 + 5$

6. Solve: $2^{x^2} = \left(16^{x-1}\right)\left(2^x\right)$

7. Solve to three decimal places: $8^{5x-2} = 69$

8. The half-life of a radioactive substance is 23 days. How long will it be until the amount remaining is 10% of the initial amount?

9. Graph $y = 3^x$ and $y = 3^{x+1} - 2$. Find the domain, range and give the equations of any asymptotes.

10. Graph $y = \log_3 x$ and $y = \log_3(x+3) - 1$. Find the domain, range and give the equations of any asymptotes.

11. Two earthquakes measure 7.3 and 5.2 on the Richter scale. How many times more powerful is the first than the second?

12. Write as a single log: $\log A - 2\log B - \dfrac{1}{5}\log C$

13. Solve to the nearest hundredth: $(\log_x 3)(\log_3 6) = 2$

14. Solve: $2\log m + 3\log m = 10$

15. Solve: $\log_2(2m+4) - \log_2(m-1) = 3$

16. If $\log_3 x = 2$ and $\log_3 y = 5$, find:
   a) $\log_3(9x^2 y)$
   b) $\log_3\left(\dfrac{3x^2}{y}\right)$

17. If $\log_3 2 = x$ and $\log_3 5 = y$, find an expression in x and y for $\log_3 180$

18. Evaluate to the nearest hundredth:
   a) $\log_3 15$
   b) $\log_4 27$

19. Express y as a function of x and state the domain: $\log 3 + \log y = \log(x+2) - \log x$

20. Solve to two decimal places: $5^{x+1} = 2^{1-x}$

21. Solve to two decimal places: $\log_2(\log_8 x) = -1$

22. Solve: $22 = e^{3t}$

23. The point (1024, 5) goes through the function $y = \log_a x$. What is a?

24. Simplify:
   a) $e^{\ln a}$
   b) $3^{2\log_3(2x+1)}$

SOLUTIONS

1. $\log_p r = q$

2. $x^m = y$

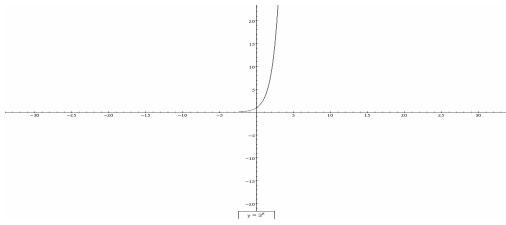3. b) $5000(1.005)^{12t}$

4. c) $5000(1.06)^t$

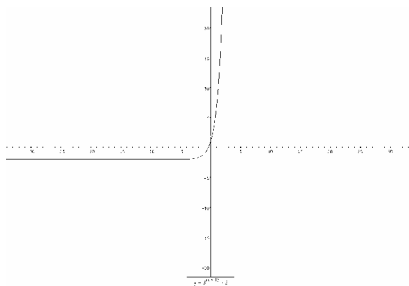5. b) $\log_5 x^2 - \log_5 y^3 - 1$
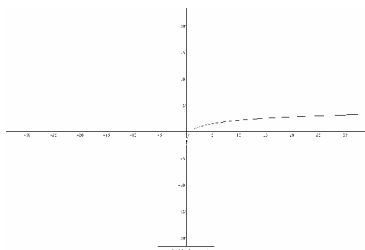
6. x = 4 , x = 1

7. x = 0.807

8. 76.40 days

9. $y = 3^x$ D: All Real #'s   R: y > 0   Asymptote: y = 0
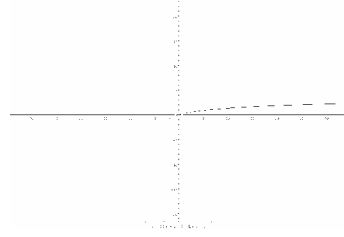

$y = 3^{x+1} - 2$ D: All Real #'s   R: y > -2   Asymptote: y = -2

10. $y = \log_3 x$ D: x > 0   R: All Real #'s   Asymptote: x = 0

$y = \log_3(x + 3) - 1$ D: x > -3   R: All Real #'s   Asymptote: x = -3

11. 125.89 times more powerful

12. $\log\left(\dfrac{A}{B^2 \sqrt[5]{C}}\right)$

13. $x = \sqrt{6}$

14. m = 100

15. m = 2

16. a) 11   b) 0

17. 2x + y + 2

18. a) 2.46   b) 2.38

19. $y = \dfrac{x+2}{3x}$ D: x > 0

20. x = -0.40

21. x = 2.83

22. t = 1.03

23. a = 4

24. a) a   b) $(2x+1)^2 = 4x^2 + 4x + 1$