

Pre-Calculus
Unit 2 Review

Name Key

Hour _____

1. Simplify:

$$\log_2 2^{3x} = 3x$$

$$\ln e^{3x} + \ln e^{2x} = 3x + 2x = 5x$$

2. Evaluate using a calculator. Round to 3 decimal places.

$$\log_{150} 12$$

$$\log_3 513$$

3. Expand by using the properties of logs to rewrite each expression as the sum or difference:

a) $\log_4 \frac{\sqrt{5x}}{y^3}$

$$\frac{1}{2} [\log_4 5 + \log_4 x] - 3 \log_4 y$$

b) $\ln 5x^7y^8$

$$\ln 5 + 7 \ln x + 8 \ln y$$

4. Condense the following expressions:

a) $7 \log_5 b - \frac{1}{3} \log_5 a$

$$\log_5 \frac{b^7}{\sqrt[3]{a}}$$

b) $7 \ln x + \frac{1}{2} \ln y + \ln(z-7)$

$$\ln x^7 \sqrt{y} (z-7)$$

5. Solve for x. Round to the nearest hundredth if necessary.

a) $\log_5(x+10) = \log_5 17$

$$x+10 = 17$$

$$x = 7$$

d) $6(4e^{2x} - 7) = 1200$

$$4e^{2x} - 7 = 200 \quad 2x = \frac{\ln 207}{4}$$

$$4e^{2x} = 207$$

$$e^{2x} = \frac{207}{4}$$

$$x = \frac{\ln \frac{207}{4}}{2}$$

$$= 1.973$$

b) $(7^{2x} + 3)^2 = 58$

$$7^{2x} + 3 = \sqrt{58}$$

$$7^{2x} = \sqrt{58} - 3$$

$$2x = \log_7(\sqrt{58} - 3)$$

$$x = \frac{\log_2(\sqrt{58} - 3)}{2}$$

e) $7 \log_4 5x = 19$

$$\log_4 5x = \frac{19}{7}$$

$$5x = 4^{\frac{19}{7}}$$

$$x = \frac{4^{\frac{19}{7}}}{5}$$

c) $8^{5x-3} + 7000 = 2090152$

$$8^{5x-3} = 2083152$$

$$5x-3 = \log_8 2083152$$

$$x = \frac{\log_8 2083152 + 3}{5}$$

f) $\log_5 x - 5 = 120$

$$x - 5 = 5^{120}$$

$$x = 5^{120} + 5$$

$$x = 5^{120} + 5$$

6. You have \$4,500 to invest into an account that earns 4% interest.

- a) If the account compounds continuously. How many years will it take to double your money?

Use the formula:

$$A = Pe^{rt}$$

$$A = 9000$$

$$P = 4500$$

$$r = .04$$

$$t = ?$$

$$9000 = 4500 e^{.04t}$$

$$2 = e^{.04t}$$

$$\ln 2 = .04t$$

$$t = 17.3 \text{ years}$$

- b) If the account compounds annually. How many years will it take to double your money?

Use the formula:

$$A = P\left(1 + \frac{r}{n}\right)^{nt}$$

$$A = 9000$$

$$P = 4500$$

$$r = .04$$

$$n = 1$$

$$t = ?$$

$$9000 = 4500 \left(1 + \frac{.04}{1}\right)^{1 \cdot t}$$

$$2 = 1.04^t$$

$$\log_{1.04} 2 = t$$

$$t = 17.7 \text{ years}$$

- c) If the account compounds monthly. How many years will it take to double your money?

$$A = 9000$$

$$P = 4500$$

$$r = .04$$

$$n = 12$$

$$t = ?$$

$$9000 = 4500 \left(1 + \frac{.04}{12}\right)^{12t}$$

$$2 = 1.003^{12t}$$

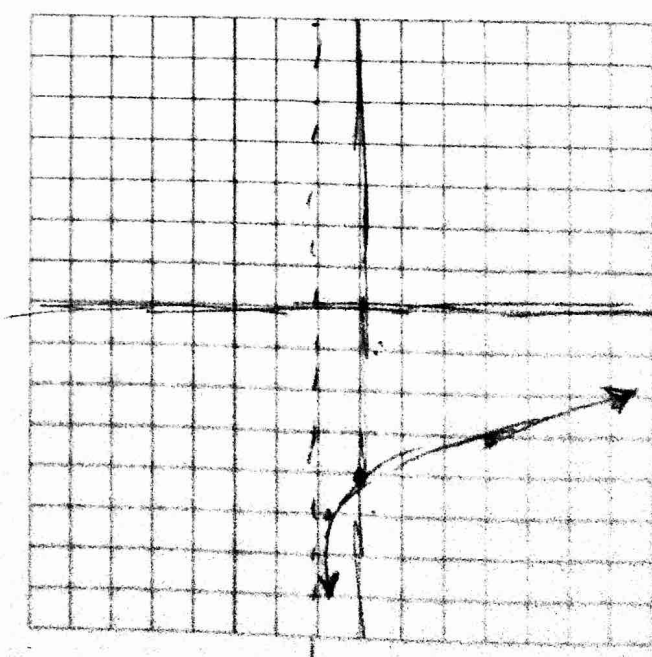
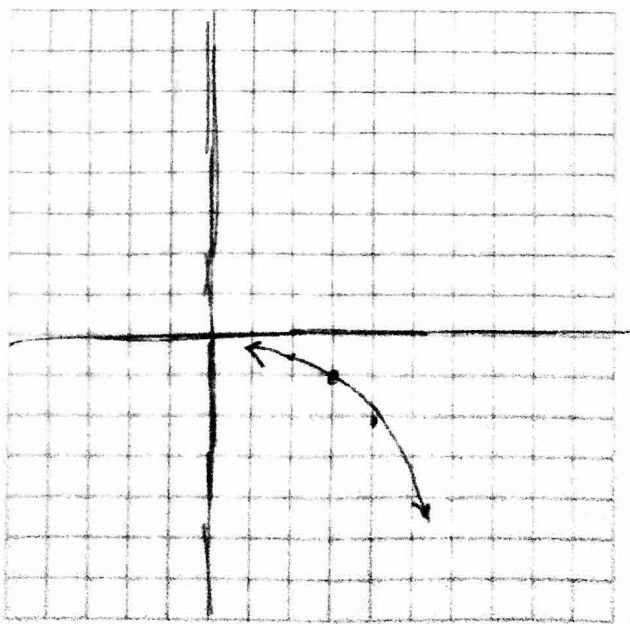
$$\log_{1.003} 2 = 12t$$

$$t = 19.3 \text{ years}$$

7. Graph the equations on the coordinate plane without the use of a calculator.

a. $f(x) = -2^{x-3}$

b. $g(x) = \log_4(x+1) - 4$



x	log
-1	
0	
1	
4	
1	
4	