

H. Math 3 Remediation Sheet for Unit 3

Name _____

1) Write in exponential form $\ln x = p$

$$e^p = x$$

2) Write in log form $m^c = p$

$$\log_m P = c$$

3) Expand: $\log x^4 y^3$

$$4 \log x + 3 \log y$$

4) Condense: $5 \log_2 x - 4 \log_2 m$

$$\log_2 \frac{x^5}{m^4}$$

5) Simplify: $(5e^{-4x})^{-2}$

$$\frac{1}{25} e^{8x}$$

6) Solve: $e^{2x} - 5 = 19$

$$\begin{aligned} e^{2x} &= 24 \\ \ln e^{2x} &= \ln 24 \\ 2x &= \ln 24 \\ x &= \frac{\ln 24}{2} \end{aligned}$$

$$x \approx 1.59$$

7) Solve: $14 - \ln(x-3) = 8$

$$\frac{-\ln(x-3)}{-1} = \frac{-6}{-1}$$

$$\ln(x-3) = 6$$

$$\log_e(x-3) = 6$$

$$e^6 = x-3$$

$$e^6 + 3 = x$$

$$406.43$$

8) Solve: $25^{x+4} = 125^{3x-2}$

$$5^{2(x+4)} = 5^{3(3x-2)}$$

$$2x+8 = 9x-6$$

$$8 = 7x-6$$

$$14 = 7x$$

$$2 = x$$

9) Solve: $\log_5(x+3) + \log_5(x+2) = \log_5 6$

$$\log_5(x+3)(x+2) = \log_5 6$$

$$x^2 + 5x + 6 = 6$$

$$x^2 + 5x = 0$$

$$x(x+5) = 0$$

$$x = 0 \quad x = -5$$

10) Suppose you deposit \$4500 in an account that pays 3.5% interest compounded quarterly. How long will it take to reach \$7000?

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

$$7000 = 4500 \left(1 + \frac{0.035}{4}\right)^{4t}$$

$$\frac{7000}{4500} = \frac{4500}{4500} (1.00875)^{4t}$$

$$\frac{14}{9} = 1.00875^{4t}$$

$$\log\left(\frac{14}{9}\right) = 4t \log(1.00875)$$

$$(4 \log(1.00875)) \quad 4 \log 1.00875$$

$$12.67 \approx t \quad \{13 \text{ yrs}\}$$

H. Math 3 Remediation Sheet for Unit 3

Name _____

11) Suppose you invest \$700 in the bank and it is compounded continuously at 4.25%. How long will it take to double?

$$A = Pe^{rt}$$

$$1400 = 700e^{0.0425t}$$

$$2 = e^{0.0425t}$$

$$\ln 2 = \ln e^{0.0425t}$$

$$\frac{\ln 2}{0.0425} = \frac{0.0425t}{0.0425}$$

About 16.4 years

12) A cup of coffee contains 140 mg of caffeine. If caffeine is eliminated from the body at a rate of 12% per hour, how long will it take for half of this caffeine to be eliminated?

$$y = a(b-r)^x$$

$$70 = 140(1-0.12)^t$$

$$70 = 140(.88)^t$$

$$1/2 = .88^t$$

$$\log(1/2) = \log .88^t$$

$$t = \frac{\log(1/2)}{\log .88}$$

$t \approx 5 \text{ hrs}$

13) Suppose you invest \$850 in a bank at 3.25% interest compounded monthly. How much money will you have in 8 years?

$$A = 850\left(1 + \frac{0.0325}{12}\right)^{12(8)}$$

$$A = \$1102.00$$

14) Evaluate: $\log_2 8 - \log_2 4$

$$3 - 2 = 1$$

$$\log_2 \frac{8}{4}$$

$$\log_2 2$$

$$2^x = 2$$

15) Harry purchased a car for \$26,700. The value of the car decreases by 13% every year. What will be the value of the car in 10 years?

$$y = 26,700(1-0.13)^{10}$$

$$y = \$16,329.1$$

16) Write a function that translates $y = 3^x$ five units to the left and 4 units up

$$y = 3^{x+5} + 4$$

17) Solve: $x^2 - 6x - 3 = 0$

$$x^2 - 6x + 9 = 3 + 9$$

$$(x-3)^2 = 12$$

$$x-3 = \pm 2\sqrt{3}$$

$$x = 3 \pm 2\sqrt{3}$$

18) Solve: $2|x-4| - 3 > 9$

$$2|x-4| > 12$$

$$|x-4| > 6$$

$$x-4 > 6 \quad x-4 < -6$$

$$x > 10 \quad x < -2$$

19) Find $f \circ g(x)$ if $f(x) = x^2 - 7$ & $g(x) = 3x - 2$

$$f(g(x))$$

$$f(3x-2)$$

$$(3x-2)^2 - 7$$

$$9x^2 - 12x + 4 - 7$$

$$9x^2 - 12x - 3$$

20) Find $f^{-1}(x)$ if $f(x) = 7x - 2$

$$x = 7y - 2$$

$$\frac{x+2}{7} = \frac{7y}{7}$$

$$y^{-1} = \frac{1}{7}x + \frac{2}{7}$$