#20 Algebra 2 Combo Worksheet Name: _____

Determine whether the function shows growth or decay, find the percent of increase or decrease and give the domain and range.

1. $y=\left(\frac{8}{3}\right)^x$ $y = 2.6\overline{6}$

Growth or Decay? Growth

Percent Increase/Decrease? 166%

Domain: $\mathbb{R}$ Range: $y>0$

2. $y=\frac{1}{2}\left(\frac{1}{4}\right)^x$

Growth or Decay? Decay

Percent Increase/Decrease? 75%

Domain: $\mathbb{R}$ Range: $y>0$

II. Write an exponential function $y = ab^x$ to model the information. Then use your model to make the requested prediction or estimate the time.

3. Suppose you buy a computer that costs \$1150 and expect for its value to depreciate by 42% each year. What will be the computer's resale value in 3 years?

$y = 1150(.58)^x$

\$224.38

4. If a stock priced at \$27 increases at a rate of 6.04% each year, when will it be worth approximately \$100? Round to the nearest tenth of a year.

$y = 27(1.0604)^x$

23 years

III. Given $f(x)$, find the equation of its inverse, $f^{-1}(x)$.

5. $f(x)=\frac{x}{7}+5$

$x = \frac{y}{7}+5$

$(7)\,x-5=\frac{y}{7}(7)$ $y^{-1} = 7x-35$

6. $f(x)=(x-3)^2+5$

$x=(y-3)^2+5$

$x-5=(y-3)^2$

$\pm\sqrt{x-5}=y-3$ $y^{-1} = 3\pm\sqrt{x-5}$

IV. Rewrite each equation in logarithmic form.

7. $\left(\frac{1}{2}\right)^{-4}=16$

$\log_{\frac{1}{2}} 16 = -4$

8. $10^{-4}=0.0001$

$\log .0001 = -4$

VI. Rewrite each equation in exponential form.

9. $\log_2 32=5$

$2^5 = 32$

10. $\log 1000=3$

$10^3 = 1000$

V. Evaluate each logarithm WITHOUT the calculator.

11. $\log_4 16 = x$

2

12. $\log 1 = x$

0

13. $\log_{\frac{1}{3}} 27 = x$

-3

14. $\log_x 32 = 5$

2

15. $\log_x 64 = 2$

8

16. $\log_x 5 = 1$

5

17. $\log_{\frac{1}{2}} x = -4$

-2

18. $\log_4 x = 1$

4

Write as a single log. Simplify if possible.

1. $\log_5 50 + \log_5 62.5$ $\log_5 3125 = 5$	2. $\log_3 3 + \log_3 27$ $\log_3 81 = 4$	3. $\log 100 + \log 1000$ $\log 100000 = 5$
4. $\log_4 320 - \log_4 5$ $\log_4 64 = 3$	5. $\log 5.4 - \log 0.54$ $\log 10 = 1$	6. $\log_6 496.8 - \log_6 2.3$ $\log_6 216 = 3$

Simplify if possible. Show all work

7. $\log_8 8^2 = x$ $8^x = 8^2$ $x = 2$	8. $\log_3 3^5 = x$ $3^x = 3^5$ $x = 5$	9. $\log_7 49^3 = x$ $7^x = 49^3$ $7^x = 7^{2\cdot 3}$ $x = 6$	10. $\log_{\frac{1}{2}} (.25)^4 = x$ $\frac{1}{2}x = .25^4$ $-x = -8$ $2^{-1\cdot x} = \frac{1}{4}^4$ $x = 8$ $2^{-x} = 4^{-1\cdot 4}$ $2^{-x} = 2^{2\cdot -1\cdot 4}$

11. $\log_2 32 - \log_2 128$ $\log_2 \frac{1}{4} = -2$	12. $\log 0.1 + \log 1 + \log 10$ $\log 1 = 0$	13. $7^{\log_7 7} - \log_7 7^7$ $7 - 7 = 0$

Write as a single log. Simplify if possible.

14. $\log_8 4 + \log_8 16$ $\log_8 64 = 2$	15. $\log 2 + \log 5$ $\log 10 = 1$	16. $\log_{2.5} 3.125 - \log_{2.5} 5$ $\log_{2.5} .625 = -.5129\ldots$
17. $\log 1000 - \log 100$ $\log 10 = 1$	18. $\log_2 16 - \log_2 2$ $\log_2 8 = 3$	19. $\log_{1.5} 6.75 - \log_{1.5} 2$ $\log_{1.5} 3.375 = 3$

Simplify if possible. Show all work

20. $\log_2 16^3 = x$ $2^x = 16^3$ $2^x = 2^{4\cdot 3}$ $x = 12$	21. $\log(100)^{0.1} = x$ $10^x = 100^{.1}$ $10^x = 10^{2\cdot .1}$ $x = .2$	22. $\log_5 125^{\frac{1}{3}} = x$ $5^x = 125^{1/3}$ $5^x = 5^{3(1/3)}$ $x = 1$	23. $\log_3 3^{7+x} = x$ $3^x = 7 + x$ $x = 7 + x$ $7+x=1$ $-7\ -7$ $x=-6$