Name: Key Date: _____ Block: ____ #____

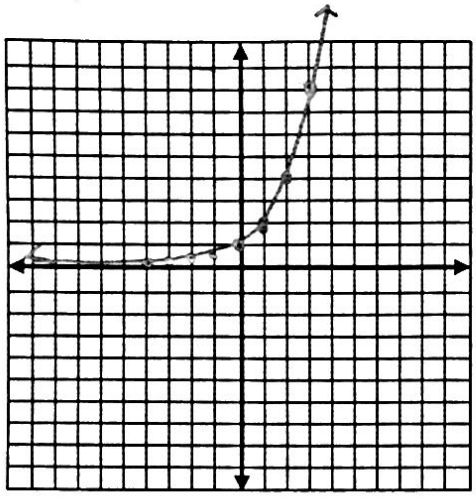
Algebra 2 – Chapter 7 REVIEW

Show all work for credit!!!

1. Graph the equation.

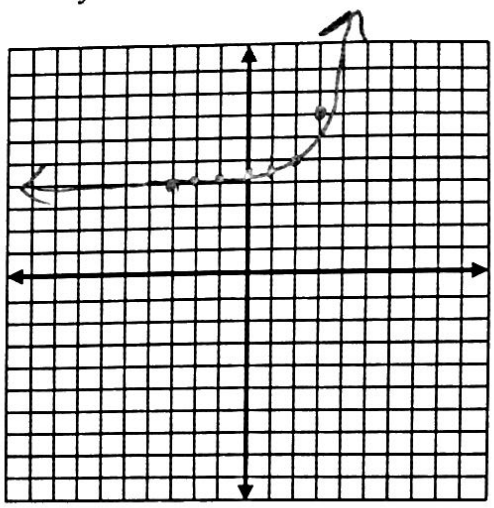
a) $y = 2^x$

X	Y
-4	.0625
-3	.125
-2	.25
-1	.5
0	1
1	2
2	4
3	8



b) $y = 3^{x-2} + 4$

-3	4.00
-2	4.01
-1	4.04
0	4.11
1	4.33
2	5
3	7



2. Without graphing, determine whether each equation represents exponential growth or exponential decay. Then find the y-intercept.

a) $y = 10^x$

Growth

y-int (0,1)

b) $y = 1.023(0.98)^x$

Decay

y-int (0, 1.023)

c) $y = 7\left(\frac{2}{5}\right)^x$

Decay

y-int (0, 7)

3. Mr. Andersen put $1000 into an account that earns 4.5% annual interest. The interest is compounded annually and there are no withdrawals. How much money will be in the account at the end of 30 years?

$A(30) = 1000(1+.045)^{30}$

$\$3745.32$

4. A manufacturer bought a new rolling press for $48,000. It has depreciated in value at an annual rate of 15%. What is its value 5 years after purchase?

$A(5) = 48000(.85)^5$

$\$21,297.86$

5. You place $900 in an investment account that earns 7.5% interest compounded continuously. Find the balance after 5 years.

$A(5) = 900e^{.075(5)}$

$= \$1309.49$

6. Write the equation in logarithmic form: $9^3 = 729$

$\log_9 729 = 3$

7. Evaluate each logarithm.

a) $\log_4 256$

$4^x = 256$

$4^x = 4^4$

$x = 4$

b) $\log_{27} 9$

$27^x = 9$

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

$3x = 2$

$x = 2/3$

8. Write each expression as a single logarithm.

a) $\log 8 + \log 3$

$\log 24$

b) $6\log_2 x + 3\log_2 x$

$\log_2 x^6 x^3$

$\log_2 x^9$

c) $\log_5 4 + 4\log_5 2 - \log_5 x$

$\log_5 \frac{4 \cdot 2^4}{x} = \log_5 \frac{64}{x}$

9. Expand each logarithm.

a) $\log_b 2x^2y^3$

$\log_b 2 + 2\log_b x + 3\log_b y$

b) $\log_b \frac{\sqrt[5]{x^3}}{7} = \log_b \frac{x^{3/5}}{7}$

$3/5 \log_b x - \log_b 7$

10. Use the change of base formula to evaluate the expression.

a) $\log_4 13$ $\frac{\log 13}{\log 4} \approx 1.85$

11. The first permanent English colony in America was established in Jamestown, Virginia, in 1607. From 1620 through 1780, the population P (in thousands) of colonial America can be modeled by the equation $P = 8863(1.04)^t$ where t is the number of years since 1620. When was the population of colonial America about 345,000?

$P = 8863(1.04)^t$

$\frac{345000}{8863} = \frac{8863(1.04)^t}{8863}$

$38.93 = 1.04^t$

$\frac{\log 38.93}{\log 1.04} = \frac{t \log 1.04}{\log 1.04}$

$t = 93.36$

$1620 + 93 = 1713$

In 93 years or in 1713

12. A parent increases a child's allowance by 22% each year. If the allowance is \$30 now, when will it double?

$\frac{60}{30} = \frac{30(1.22)^x}{30}$

$2 = 1.22^x$

$\frac{\log 2}{\log 1.22} = \frac{x \log 1.22}{\log 1.22}$

$x = 3.49$

In 3½ years

13. Solve each equation. Check for extraneous solutions.

a) $\sqrt[3]{y^2} = 4$

$y^{2/3} = 4$

$\frac{2/3 \log y}{2/3} = \frac{\log 4}{2/3}$

$\log y = .90$

$10^{.90} = y$

$y = 7.94$

b) $2 - 4^x = -62$

$-2 \quad -2$

$-4^x = -64$

$4^x = 64$

$4^x = 4^3$

$x = 3$

c) $\log x + \log 6 = 8$

$\log 6x = 8$

$10^8 = 6x$

$\frac{100000000}{6} = \frac{6x}{6}$

$x = 16666666.67$

d) $\log_3(x+1) = 4$

$3^4 = x + 1$

$81 = x + 1$

$-1 \quad -1$

$x = 80$

e) $e^x = 5$

$x \ln e = \ln 5$

$x = 1.61$

f) $\log x + \log(x+3) = 1$

$\log(x^2 + 3x) = 1$

$10^1 = x^2 + 3x$

$0 = x^2 + 3x - 10$

$0 = (x+5)(x-2)$

$x \neq -5 \quad x = 2$

check:

$\log(-5) + \log(-2) = 1$

X

$\log 2 + \log 5 = 1$

$1 = 1$ ✓

g) $\log 5x + \log(x-1) = 2$

$\log(5x^2 - 5x) = 2$

$10^2 = 5x^2 - 5x$

$0 = 5x^2 - 5x - 100$

$0 = 5(x^2 - x - 20)$

$0 = (x-5)(x+4)$

$x = 5 \quad x \neq -4$

check:

$\log 25 + \log 4 = 2$

$2 = 2$ ✓

$\log(-20) + \log(-5) = 2$

X