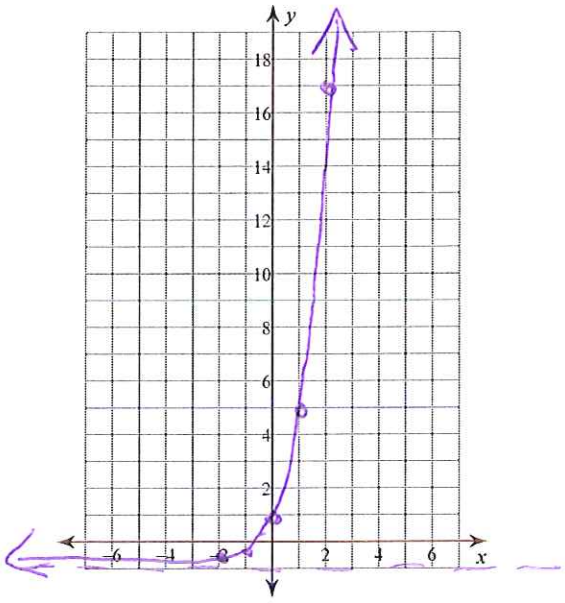
Algebra 2 Name Key ID: 1

Chapter 7 Review

Date _____ Period ____

Sketch the graph of each function. Then state the domain and range and the horizontal asymptote.

1) $y = 2 \cdot 3^x - 1$



X	Y
-2	-.8
-1	-.3
0	1
1	5
2	17

Domain: $(-\infty, \infty)$ or $\mathbb{R}$

Range: $(-1, \infty)$ or $X > -1$

Write down the formulas you will need to know.

2) a) Exponential Growth and Decay: $A(t) = a(1 \pm r)^t$

b) Compound Interest (not continuous): $A(t) = P\left(1 + \frac{r}{n}\right)^{nt}$

c) Continuous Compound Interest: $A(t) = Pe^{rt}$

Solve

3) You invest \$3000 into a bank account that earns 2% interest compounded monthly.

A) How much is in the account after 18 months?

$A\left(\frac{18}{12}\right) = 3000\left(1 + \frac{.02}{12}\right)^{12\left(\frac{18}{12}\right)}$

\$3091.29

B) How much will you earn in interest in 12 years?

$A(12) = 3000\left(1 + \frac{.02}{12}\right)^{12 \cdot 12} = 3812.99$

-3000

\$812.99

C) After how many years will you double your money? Round to the nearest hundredth.

$6000 = 3000\left(1 + \frac{.02}{12}\right)^{12t}$

$2 = \left(1 + \frac{.02}{12}\right)^{12t}$

$\log 2 = 12t \log\left(1 + \frac{.02}{12}\right)$

$t \approx 34.69$ years

4) Your bank account earns 4% interest compounded continuously.

a) If you invest $2000, what will be your balance after 4 years?

$A(4) = 2000e^{.04(4)}$

$\$2347.02$

b) If you want to have $5000 in the account in 10 years, how much would you have to invest today?

$\frac{5000}{e^{.04(10)}} = \frac{Pe^{.04(10)}}{e^{.04(10)}}$

$P = \$3351.60$

5) A car depreciates 12% each year. If you purchase a car for $21,500, how much will it be worth after 3 years?

$A(3) = 21{,}500(1-.12)^3$

$\$14{,}051.65$

6) You purchase an antique vase worth $100. It's value is expected to increase at 2% each year.

A) After how many years will the vase double in value?

$200 = 100(1+.02)^t$

$2 = 1.02^t$

$\log 2 = t \log 1.02$

$t \approx 35$ years

B) What will your vase be worth after 30 months?

$A\left(\frac{30}{12}\right) = 100(1+.02)^{30/12}$

$= \$105.08$

Rewrite each equation in logarithmic form.

7) $11^2 = 121$

$\log_{11} 121 = 2$

8) $7^{-3} = \frac{1}{343}$

$\log_7 \frac{1}{343} = -3$

Rewrite each equation in exponential form.

9) $\log_{15} \frac{1}{225} = -2$

$15^{-2} = \frac{1}{225}$

10) $\log_{19} 361 = 2$

$19^2 = 361$

What is the y-intercept and the horizontal asymptote of the following functions?

11) $y = -2 \cdot 3^{x+5}$

Y-intercept? $y = -486$

Horizontal Asymptote? $y = 0$

12) $y = 5 \cdot 4^{x-3} - 7$

Y-intercept? $\frac{-443}{64}$

Horizontal Asymptote? $y = -7$

Evaluate each to the nearest thousandth.

13) e^4 54.598

14) $\log_3 7$ 1.771

Evaluate each expression.

15) $\log_3 27$ 3

16) $\log_3 81$ 4

Condense each expression to a single logarithm.

17) $\log_7 x + \log_7 y + 4\log_7 z$

$\log_7(XYZ^4)$

18) $2\log_3 11 - 4\log_3 6$

$\log_3\left(\frac{11^2}{6^4}\right) = \log_3\left(\frac{121}{1296}\right)$

Expand each logarithm.

19) $\ln \frac{7^2}{x^3}$

$2\ln 7 - 3\ln x$

20) $\log_5 (x^4 \cdot y)^2$

$8\log_5 x + 2\log_5 y$

Solve each equation.

21) $64^{2-3x} = 16$

$(2-3x)\log 64 = \log 16$

$x = 4/9$

22) $2^{-3n} + 7 = 39$

$2^{-3n} = 32$

$-3n \cdot \log 2 = \log 32$

$n = -5/3$

Solve each equation. Round your answers to the nearest ten-thousandth.

23) $20^{-n} = 5$

$-n\log 20 = \log 5$

$n \approx -.5372$

24) $\frac{7 \cdot 7^{p+4}}{7} = \frac{51}{7}$

$7^{p+4} = \frac{51}{7}$

$(p+4)\log 7 = \log\left(\frac{51}{7}\right)$

$p \approx -2.9794$

Solve each equation.

25) $\log_5 (x-6) - \log_5 x = 1$

$\log_5\left(\frac{x-6}{x}\right) = 1$

$x \cdot 5^1 = \frac{x-6}{x} \cdot x$

$5x = x - 6$

$4x = -6$

$x = -6/4$

$\{-3/2\}$

26) $\ln -2x + \ln 10 = 2$

$\ln(-20x) = 2$

$e^2 = -20x$

$x \approx -.3695$

27) $e^{x-4} - 4 = 41$

$e^{x-4} = 45$

$\ln(x-4)\ln e = \ln 45$

$x - 4 = \ln 45$

$x \approx 7.8067$

28) $\frac{10\log_5 x}{10} = \frac{130}{10}$

$\log_5 x = 13$

$5^{13} = x$

$x = 1{,}220{,}703{,}125$