Name: Completed Period _____

7.2 Practice Day 1

Write the exponential function that passes through the given points $y = a \cdot b^x$

1. $(0,3)$ *and* $(2,12)$ (a, x, y)

$12 = 3(b)^2$

$4 = b^2$

$2 = b$

$y = 3(2)^x$

2. $(0,16)$ *and* $(3,.25)$ (a, x, y)

$.25 = 16(b)^3$

$.015625 = b^3$

$\sqrt[3]{.015625} = \sqrt[3]{b^3}$

$.125 = b$

$y = 16(.125)^x$

3. $(0,.5)$ *and* $(4,40.5)$ (a, x, y)

$40.5 = .5(b)^4$

$81 = b^4$

$\sqrt[4]{81} = \sqrt[4]{b^4}$

$3 = b$

$y = .5(3)^x$

4. $(0,256)$ *and* $(4,81)$

$81 = 256(b)^4$

$\sqrt[4]{\frac{81}{256}} = \sqrt[4]{b^4}$

$\frac{3}{4} = b$

$y = 256\left(\frac{3}{4}\right)^x$

5. Ahmed's consulting firm began with 23 clients. After 7 years, he now has 393 clients. Write an exponential equation describing the firm's growth.

$(0, 23)$ $(7, 393)$

$393 = 23(b)^7$

$\frac{393}{23} = b^7$

$\sqrt[7]{\frac{393}{23}} = b$

$1.5 = b$

$y = 23(1.5)^x$

For each of the following write the function that models the scenario and then answer the questions that follow.

5. The number of registered users on a website was 5000 in 2000. During the next 6 years, the number of registered users increased by about 40% each year.

a. Initial Amount: 5000 % Increase or Decrease: .40

Growth/Decay Factor $(1 \pm r)$: 1+.4 Model: $A = 5000(1+.4)^t$

b. How many users were there in 2004? ($t = 4$)

$A = 5000(1.4)^4 = 19208$ users

c. In approximately what year were there 120000 users.

$120000 = 5000(1.4)^t$

$24 = (1.4)^t$

$y_1 =$ $y_2 =$

find intersection

intersection: $(9.445, 24)$

In 2009 there were 120 000 users

$A = P(1 + \frac{r}{n})^{n \cdot t}$

6. A savings account at the bank earns 3% interest compounded annually. At the beginning of the year, you deposit $2000 into this account. You want to know what the value of this account will be in t years if no other deposits are made.

   a. Initial Amount: $2000 = P$ % Increase: $.03 = r$

   Compounding: $n=1$ Model: $A = 2000(1 + \frac{.03}{1})^{1 \cdot t}$

   b. How much money will there be in 3 years? How much money will there be in 5 years?

   $A = 2000(1+.03)^3$ $\$2185.45$

   $A = 2000(1+.03)^5$ $\$2318.55$

   c. In approximately how many years will the $$ double?

   $4000 = 2000(1.03)^t$

   $y_1 = 2$ $y_2 = (1.03)^t$ intersection (23.45, 2)

   23.45 years to double

7. The temperature of a 100°F object cools at a rate of 10% each hour.

   a. Initial Amount: 100 % Increase or Decrease: .10

   Growth/Decay Factor $(1 \pm r)$: $1 - .10 = .9$ Model: $A = 100(.9)^t$

   b. What temperature is the object in 5 hours?

   $A = 100(.9)^5$

   $A = 59.049°F$

   c. How long will it take to reach 80°F?

   $y_1 = 80$ $y_2 = 100(.9)^t$ intersection: (2.118, 80)

   2.118 hours to reach 80°F

8. Julie invests $3500 into an account that pays 3.5% yearly interest. How much money will Julie have in 5 years if the interest is $A = P(1 + \frac{r}{n})^{nt}$

   a. compounded monthly? $n=12$ $\$4168.30$

   $A = 3500(1 + \frac{.035}{12})^{(12 \cdot 5)}$

   b. compounded quarterly? $n=4$ $\$4166.19$

   $A = 3500(1 + \frac{.035}{4})^{4 \cdot 5}$

   c. compounded semi-annually? $n=2$ $\$4163.06$

   $A = 3500(1 + \frac{.035}{2})^{2 \cdot 5}$

   d. compounded daily? $n=365$ $\$4169.33$

   $A = 3500(1 + \frac{.035}{365})^{365 \cdot 5}$