*Review 6.4-6.5 (****Key****)*

1. Use the exponential equality to solve each equation. Round your answers to 4 decimal places as needed.

a. =

  **=**

 **=**

 **Equate exponents and solve for *x*:**

 **2*x* 11 = 9*x***

 **7*x =***

 ***x =***

b. =

 **=**

 **=**

 **6*x* 15 = 1/2**

 **6*x =***

 ***x =* or**

2. Solve each exponential equation. Give answers in exact form, then estimate to 4 decimal places.

a. 7(1.2 – ) = 0.63

**Steps: (1) Isolate the power (the term containing the variable exponent) on one side of the equation. If necessary, divide both sides of the equation by any coefficient of the power term. (2) Convert the equation to logarithmic form. (3) Solve for the variable.**

**7(1.2 ) = 0.63**

 **1.2 = 0.09**

  **= 1.11**

 **= 1.11**  **Divide both sides by 1.**

 **= 0.25*x***

  **= *x* or  *x* 0.1813**

b. 25 = 9

 **= 0.36**

 **=**

 **=**

 ***x* = 0.9892**

3. Solve = graphically.

**Let Y1 = and Y2 = . Graphing and finding the intersection, we have:**

** *x* = 6**

 **[0, 10, 2] by [30, 16, 4]**

 **(Windows may vary)**

4. Given that = 1.7712 and = 2.1827, use the properties of logarithms to

estimate the value of the following expressions. Round your answers to 4 decimal places as

needed.

a. **= = + = 1.7712 + 2.1827 = 3.9539**

b.  **= = 2.1827 1.7712 = 0.4115**

5. Use the properties of logarithms to rewrite as a single logarithm.

**=**

**=**

**=**

**=**

6. Expand in terms of simpler logarithms. Assume that all variable expressions are positive real numbers.

**=**

**=**

**=**

**=**

**=**

7. Use properties of logarithms to solve the exponential equation. Round your answer to 4 decimal places as needed: 3 = 3081

**Steps: (1) Isolate the power on one side of the equation (2) Take the logarithm of both sides of the equation; may take common (base 10) or natural logarithm (base *e*). (3) Apply the power property of logarithms to simplify ("bring down" the variable exponent to the front). (4) Solve for the variable.**

**3 = 3081**

 **= 1027**

**ln = ln 1027**

 **= ln 1027**

**7*x* =**

 **0.6155**

8. Use properties of logarithms to solve each logarithmic equation. Round your answers to 4 decimal places as needed.

a.

**Steps: (1) Isolate the logarithmic expressions on one side of the equation; if needed, apply properties of logarithms to combine all logarithms as a single logarithm. (2) Convert the logarithmic equation to an exponential equation. (3) Solve for the variable. (4) Check for possible extraneous solutions.**

 **Multiply both sides by .**

b. 6 + = 8

**6 + 8**

 **2**

 **2/5 Equivalent to**

c. + =

 **Logarithmic equality**

 **or**

 **Verifying both solutions, we must discard , since it is not in the domain.**

9. Solve the literal equation for *T*:

 ***rs***

 ***T* *N***

10. Graph the function *y* = by applying the change of base formula.

 

 **[0, 5, 1] by [-2, 2, 1]**

 **(Windows may vary)**

11. According to the Motion Picture Association of America, the number of digital 3D

screens worldwide has increased dramatically during the last years, representing about

half of all digital screens in the world. The function *P*(*t*) = models the

number of digital 3D screens worldwide for *t* number of years after 2005. Using this model,

estimate when the number of digital 3D screens worldwide reached approximately 9,000.

Solve algebraically and answer in a complete sentence. Round your answer to the nearest

whole number. *Source: mpaa.org.*

 **Divide both sides by 89.371**

***t* =**

**The number of digital 3D screens worldwide reached approximately 9,000 in 2009.**

12. In 2006, a company sold 2,340 units. The company’s accountant noticed a 4.6% continuous annual increase in the number of units sold between 2006 and 2012.

a. Write an exponential function *N*(*t*) that models the number of units sold by the company,

where *t* is the number of years after 2006.

***N*(*t*) *=***

b. Find and interpret *N*(4). Round your answer to the nearest whole number. Answer in a

complete sentence.

***N*(4)**

**In the year 2010, the company sold approximately 2813 units.**

c. If this growth rate continues, use your model to estimate when the company will sell

approximately 6,000 units. Solve algebraically and round your answer to the nearest whole

number.

 **Recall that ln *e* = = 1**

**20 years or 2026**

13. Suppose you want to invest $5,000 in an account for *t* years.

a. Find the accumulated amount (future value) if you invest this money at 3.5% interest

compounded quarterly for 20 years. Round your answer to the hundredth.

**The accumulated amount, *A*, after *t* years in an account with principal *P* invested at an annual interest rate, *r*, (expressed as a decimal value) compounded *n* times per year is given by *A* = .**

***P* = 5000, *r* = 0.035, *n* = 4, *t* = 20**

***A* = $10,038.15**

b. Compare this return with the same principal compounded weekly for 20 years.

Answer in a complete sentence.

***P* = 5000, *r* = 0.035, *n* = 52, *t* = 20**

***A* = $10,066.39.**

**Compounding weekly will yield a higher future value.**

c. How much money would you have in your account after the 20 years if you invested your

$5,000 at 3.75% compounded continuously? Round your answer to the nearest dollar.

**The accumulated amount, *A*, after *t* years in an account with principal *P* invested at an annual interest rate, *r*, compounded continuously is given by *A* = .**

***P* = 5000, *r* = 0.0375, *t* = 20**

***A* = $10,585**

14. How much money must you invest today if you want to see your money grow to $500,000 in

30 years at 5% annual interest compounded monthly? Round to the nearest dollar.

**The present value, *P*, of an investment that will produce a future value in an account with annual interest rate, *r*, compounded *n* times per year is given by *P = A*where *A* = accumulated amount or future value, and *t* = time in years.**

***A* = 500000, *r* = 0.05, *n* = 12, *t* = 30**

***P =* 500000 $111,913**