**Chapters 14, 15, & 16 Review Packet**

**Name:**  **Date:**

**Directions: Simplify each expression. Show all your work.**

1). = 3 2). = 3

3). = 125 4). = 32

5). = $\frac{1}{10}$ 6). $5^{(-3)}$= $\frac{1}{125}$

7). = $x^{2}y^{3}$ 8). = 81$y^{4}$

9). = x 10). = 8$y^{3}$

**Directions: Identify the following geometric sequences. Identify the common ratio and the next three terms in the sequence.**

11). 3, 9, 27, 81, … 12). 972, 324, 108, 36, …

Common Ratio: 3 Common Ratio: $\frac{1}{3}$

F(5)= 243 F(5)= 12

F(6)= 729 F(6)= 4

F(7)= 2187 F(7)= 1.3333….

Sequence Equation: $f\left(x\right)=3(3)^{x-1}$ Sequence Equation: : $f\left(x\right)=972(\frac{1}{3})^{x-1}$

**Directions: answer the following question while identifying ratio and the sequence’s equation.**

13). Tom’s bank balances at the end of months 1, 2, and 3 are $1600, $1664, and $1730.56. What will Tom’s balance be at the end of month 5?

 Common Ratio: 1.04 Sequence Equation: $f\left(x\right)=1600(1.04)^{x-1}$

 F(5)= 1871.77

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 14). A ball is dropped from the top of a building. The table shows its height in feet above groundafter each bounce. What is the height of the ball at the top of bounce 7?Common Ratio: .75

|  |  |
| --- | --- |
| Bounce | Height |
| 1 | 36 |
| 2 | 27 |
| 3 | 20.25 |

Equation: $f\left(x\right)=36(.75)^{x-1}$f(7): 6.4 |

**Directions: Graph the exponential function and complete the chart.**

15). *f*(*x*) 4(2)*x*

|  |  |
| --- | --- |
| **X** | **F(x)** |
| -2 | 1 |
| -1 | 2 |
| 0 | 4 |
| 1 | 8 |
| 2 | 16 |
| 3 | 32 |
| 4 | 64 |

 F(x) $\infty $, x $\infty $

 F(x) 0, x $-\infty $

16). 

|  |  |
| --- | --- |
| **X** | **F(x)** |
| -2 | 12 |
| -1 | 6 |
| 0 | 3 |
| 1 | 1.5 |
| 2 | .75 |
| 3 | .375 |
| 4 | .1875 |

 F(x) $-\infty $, x - $\infty $ F(x) 0, x $\infty $

**Directions: Construct exponential functions based off the information given.**

 17). A pharmaceutical company is testing a new antibiotic. The number of bacteria present in a sample when the antibiotic is applied is 100,000. Each hour, the number of bacteria present decreases by half. The number of bacteria remaining r(n) is an exponential function of the number n of hours since the antibiotic was applied.

18). The NCAA basketball tournament begins with 64 teams, and after each round, half the teams are eliminated. The number of remaining teams t(n) is an exponential function of the number n of rounds already played.

19). (2, 100) and (3, 1000) 20). (-2, 4) and (-1, 8)

**Directions: Solve the following equations for x.**

21).  22). 

23).  24). 

**Directions: solve the following exponential decay and growth problems.**

25). Annual sales for a fast food restaurant are $650,000 and are increasing at a rate of 4% per year, find the value of the annual sales after 5 years.

26). The value of a company’s equipment is $25,000 and decreases at a rate of 15% per year; what is the value after 8 years?