Unit 4 Quiz Review

Simplify.

1) $x \cdot x^3 \cdot x^5$

x^9

2) $a^{-3}b^0c^6$

$\frac{c^6}{a^3}$

3) $(-4ab^4)(-5a^5b^2)$

$20a^6b^6$

4) $(2x^2)^3(x^3)^3$

$8x^{15}$

5) $\left(\frac{3xy^3}{2z}\right)^3$

$\frac{27x^3y^9}{8z^3}$

6) $\frac{-15x^7y^8z^4}{-45x^3y^5z^3}$

$\frac{x^4y^3z}{3}$

Solve each exponential equation or inequality.

7) $4^{2x+3} = 1$

$4^{2x+3} = 4^0$

$2x+3 = 0$

$x = -3/2$

8) $9^{1-2x} = 243$

$(3^2)^{1-2x} = 3^5$

$2(1-2x) = 5$

$2 - 4x = 5$

$-4x = 3$

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

9) $\left(\frac{1}{6}\right)^{3x+2} = 216$

$(6^{-1})^{3x+2} = 6^3$

$-1(3x+2) = 3$

$-3x - 2 = 3$

$-3x = 5$

$x = \frac{5}{-3}$

10) $16^{2x-3} \leq 8$

$(2^4)^{2x-3} \leq 2^3$

$8x - 12 \leq 3$

$8x \leq 15$

$x \leq \frac{15}{8}$

11) $625 \geq 5^{x+8}$

$5^4 \geq 5^{x+8}$

$4 \geq x+8$

$-4 \geq x$ or $x \leq -4$

Write an equation for each problem to help you answer the question. $y = ab^x$

12) A petri dish has 20 bacteria. Find the number of bacteria after 8 hours if the bacteria triples every hour.

$y = 20(3)^x$

$= 20(3)^8$

$y = 131,220$ bacteria

13) After how many years will a population be over 6000 if the population is currently 300 people and doubling each year?

$300(2)^x > 6000$

5 years

14) A colony of rabbits triples every year. The initial population of rabbits was 3. After x years, there were 2,187 rabbits. Find the number of years that have passed for the population of rabbits to reach this amount.

$y = 3(3)^x$

$2,187 = 3(3)^x$

6 years

Determine whether each sequence is *geometric*. If yes, then identify the common ratio.

15) 3, 18, 33, 48, ...

NO

16) 3, 3.6, 4.32, 5.184, ...

YES $R = 1.2$

Find the next three terms in each geometric sequence.

17) 216, -36, 6, -1, $\frac{1}{6}$, $-\frac{1}{36}$, $\frac{1}{216}$

Find the missing term.

18) If $a_n = \frac{1}{5} a_{n-1}$ and $a_1 = -100$, what is a_6? $r = 1/5$

$-100, -20, -4, -\frac{4}{5}, -\frac{4}{25}$ $\left\{-\frac{4}{125}\right\}$ or $\{-.032\}$

Write the recursive and explicit rule for each geometric sequence.

19) 1024, 256, 64, 16, 4, ... $a_1 = 1024$ $r = 1/4$

Ex: $a_n = 1024\left(\frac{1}{4}\right)^{n-1}$

Recursive: $a_1 = 1024$, $a_n = a_{n-1}(1/4)$

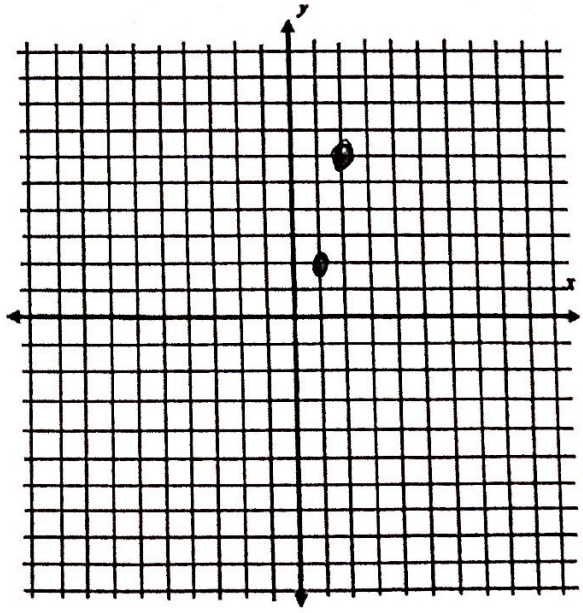
Using the given information, find all the other information about each sequence.

X	Y
1	2
2	6
3	18
4	54

20) First 5 terms of the sequence:

2, 6, 18, 54, 162

21) Graph



22) Explicit Form $a_n = 2(3)^{n-1}$

23) Recursive Form $a_1 = 2$ $a_n = a_{n-1}(3)$

24) Find a_{20}= 2,324,522,934