Name _____ Date _____ Class _____

Additional Practice *(continued)*

Investigation 4

Growing, Growing, Growing

2. A tree farm has begun to harvest a section of trees that was planted a number of years ago.

Supply of Trees

Year	0	1	2	3	4	5	6	7	8
Trees Remaining	10,000	9,502	9,026	8,574	8,145	7,737	7,350	6,892	6,543

a. Suppose the relationship between the year and the trees remaining is exponential. Approximate the decay factor for this relationship.

Divide any y-value by its previous y-value

(.95)

b. Write an equation for the relationship between time and trees remaining.

$y = 10{,}000\,(.95)^x$

c. Evaluate your equation for each of the years shown in the table below to find the approximate number of trees remaining.

Supply of Trees

Year	10	15	20	25	30	35	40
Trees Remaining	5987	4633	3585	2774	2146	1661	1285

d. The owners of the farm intend to stop harvesting when only 15% of the trees remain. During which year will this occur? Explain your reasoning.

15% would be 1500 trees

.15 · 10,000

Between 36 and 37 years

36.955 years

Name _____ Date _____ Class _____

Additional Practice *(continued)*

Investigation 4

Growing, Growing, Growing

3. Kai's brother collects fuzzy insects called tribetts. The tribett population decreases by 30% each year.

   a. Complete the table to show the number of tribetts at the end of the first 5 years for a starting population of 10,000 tribetts.

Tribett Population

Year	0	1	2	3	4	5
Tribetts	10,000	7000	4900	3430	2401	1681

Decay rate
30%
Decay Factor
1 − r
.7

   b. Write an equation for the relationship between years and number of tribetts.

$y = 10{,}000(.7)^x$

   c. In what year will there first be fewer than 1,000 tribetts?

between 6 and 7 years

6.4
6.5

4. There are 64 volleyball teams entered in the state competition. In the first round of play, each team plays one other team, so 32 games will be played in the single elimination tournament. The winners from these games play each other in a second round. The winners of the second round play each other in a third round. This continues until there is a final winning team. There are no tie games; games are played into overtime if needed.

   a. How many rounds of play are needed before a winner is determined? Explain your reasoning.

6 rounds

beginning to round 1

Rd.	Teams	Games
1	64	32
2	32	16
3	16	8
4	8	4
5	4	2
6	2	1

   b. How many total games are played before a winner is determined? Explain.

63

   c. Suppose an additional round of play is added to the playoffs. How many teams would start in the playoffs? Explain.

128 teams

Name : _____ Score : _____

Teacher : _____ Date : _____

Operations with Scientific Notation

Simplify. Write each answer in scientific notation. Round to the nearest thousandth if needed.

1) $(2.2 \times 10^5)(4 \times 10^4)$

$8.8 \cdot 10^9$

2) $\frac{9 \times 10^{-6}}{6 \times 10^{-5}}$

$1.5 \cdot 10^{-1}$

3) $(3.23 \times 10^4)(8.97 \times 10^2)$

smaller $28.9731 \cdot 10^6$ bigger

$2.89731 \cdot 10^7$

4) $(3 \times 10^{-4})(8 \times 10^{-6})$

smaller $24 \cdot 10^{-10}$ bigger

$2.4 \cdot 10^{-9}$

5) $\frac{6.77 \times 10^5}{5 \times 10^3}$

$1.354 \cdot 10^2$

6) $(6 \times 10^{-5})(9.8 \times 10^{-3})$

$58.8 \cdot 10^{-8}$ +1

$5.88 \cdot 10^{-7}$

7) $(8 \times 10^3)^2$

$64 \cdot 10^6$

$6.4 \cdot 10^7$

8) $(7 \times 10^{-3})^{-3}$

bigger $.0029 \cdot 10^9$ smaller

$2.9 \cdot 10^6$

9) $\frac{4.9 \times 10^4}{1.35 \times 10^6}$

$3.63 \cdot 10^{-2}$

10) $(8 \times 10^{-2})^2$

$64 \cdot 10^{-4}$ +1

$6.4 \cdot 10^{-3}$

11) $(9.3 \times 10^3)^2$

$86.49 \cdot 10^6$ +1

$8.649 \cdot 10^7$

12) $\frac{3.59 \times 10^{-5}}{3 \times 10^{-2}}$

$1.2 \cdot 10^{-3}$

Name : _____ Score : _____

Teacher : _____ Date : _____

Operations with Exponents

Simplify the exponents.

1) $(3c^2 \cdot c \cdot 2)^3$

$3^3 c^6 c^3 2^3$

$27c^9 8$

$216c^9$

2) $(2b^2 \cdot 4b)^3$

$2^3 b^6 4^3 b^3$

$8 \cdot 64 \cdot b^9$

$512b^9$

3) $\left(\frac{r}{r^5}\right)^3$

$\frac{r^3}{r^{15}} = \frac{1}{r^{12}}$

4) $\left(\frac{hn}{5h^5n^4}\right)^3$

$\frac{h^3 n^3}{5^3 h^{15} n^{12}} = \frac{1}{125h^{12}n^9}$

5) $h^3 \cdot h^{-5} \cdot h^{-4}$

$h^{-6} = \frac{1}{h^6}$

6) $\left(\frac{8^4}{8^3}\right)^2$

$(8)^2 = 64$

7) $\left(\frac{3}{5}\right)^5 \cdot \left(\frac{3}{5}\right)^3$ $\left(\frac{3}{5}\right)^8$

$\frac{3^8}{5^8} = \frac{6561}{390625}$

8) $\frac{2^4}{2^{-3}}$

$2^7 = 128$

9) $\left(\frac{1}{8}\right)^2 \cdot \left(\frac{1}{8}\right)^6$

$\left(\frac{1}{8}\right)^8 = \frac{1^8}{8^8} = \frac{1}{16{,}777{,}216}$

10) $\frac{n^3}{n^5}$

$\frac{1}{n^2}$

11) $(2y^3 \cdot y^2 \cdot 3y)^3$

$2^3 \cdot y^9 \cdot y^6 \cdot 3^3 \cdot y^3$

$8 \cdot y^{18} \cdot 27$

$216y^{18}$

12) $\frac{3d^2b^5}{2db^4}$

$\frac{3db}{2}$