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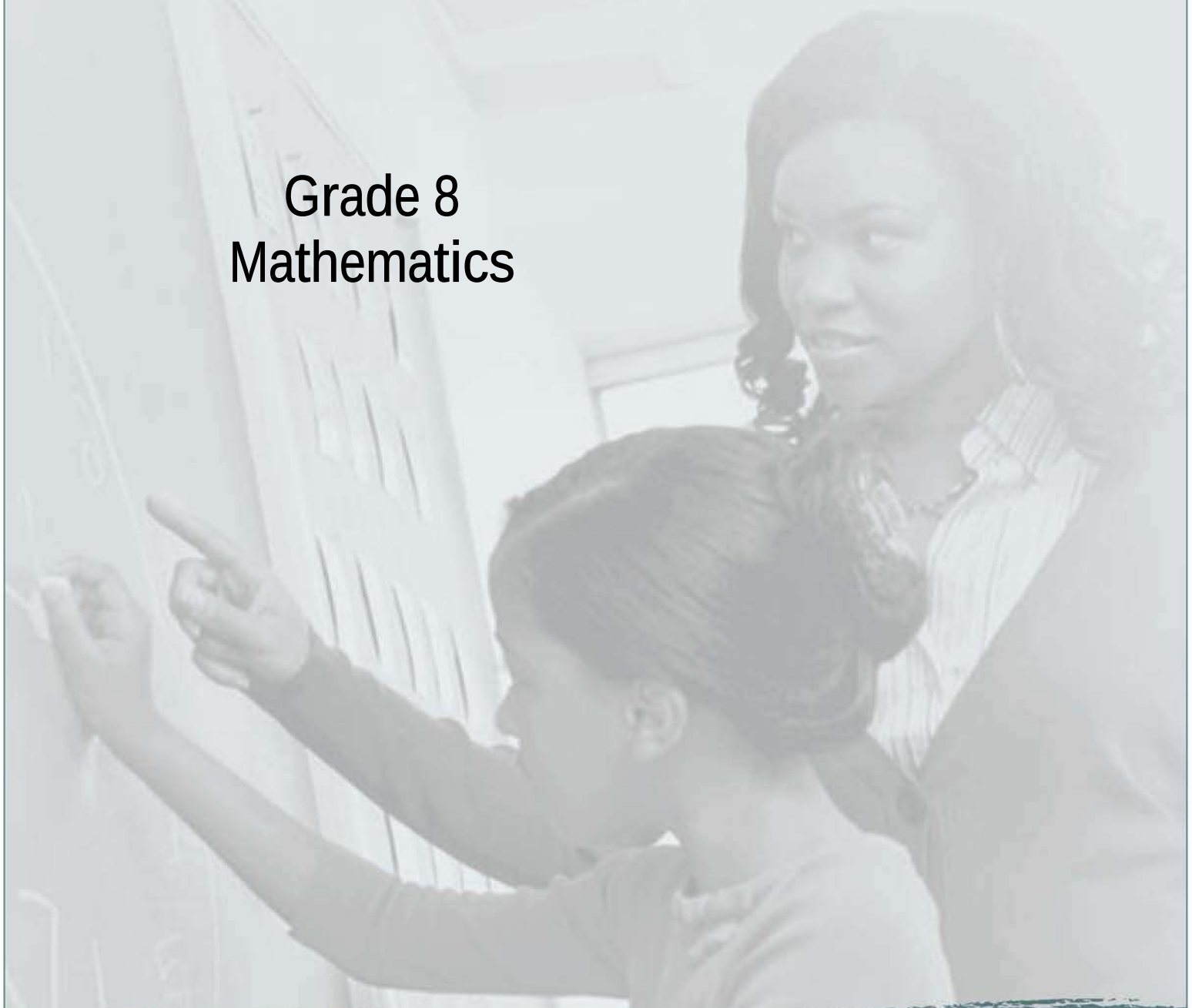
COMMON CORE STATE STANDARDS INITIATIVE
PREPARING AMERICA'S STUDENTS FOR COLLEGE & CAREER

Grade 8 Mathematics



Transitional Curriculum

REVISED 2012

BLACKLINE MASTERS

LOUISIANA DEPARTMENT OF EDUCATION

Cut these cards apart. Each group of students should have one set of cards.

$\frac{1}{2}$	$\frac{1}{4}$	$-\frac{3}{4}$	$-\frac{1}{8}$
$-\frac{3}{8}$	$\frac{7}{8}$	$\frac{1}{3}$	$\frac{2}{3}$
$\frac{5}{6}$	$\frac{5}{8}$	$\frac{1}{5}$	$-\frac{2}{5}$
$\frac{3}{5}$	$-\frac{4}{5}$	$\frac{1}{10}$	$-\frac{12}{12}$

Cut these cards apart. Each group of students should have one set of card.

-0.50	0.25	0.75	-0.125
0.375	-0.875	$-0.3\overline{3}$	$0.6\overline{6}$
$0.8\overline{3}$	-0.625	0.20	-0.40
0.60	-0.80	0.10	-1.00

Rational Numbers

Name _____ Date _____ Hour _____

Place the following numbers in the most appropriate location along the number line on the next page.

0.1^2 , 0.05 , -0.5 , $\frac{3}{4}$, -1 , 1^3 , -3 , $-\frac{5}{3}$, 2^1 , $\frac{7}{8}$, $-\frac{1}{2}$, $\frac{12}{12}$, 75% , $-2\frac{2}{6}$

Write 3 different inequalities using the numbers from the number line above using symbols <, >, =, ≤, ≥. *(example: -1 < 1)*

1.

2.

3.

Write 2 repeating inequalities using the numbers from the number line above using the symbols. <, >, =, ≤, ≥. *(example: -1 ≤ 1 ≤ 2)*

1.

2.

Unit 1, Activity 1, Rational Number with Answers

Rational Numbers
Place the following numbers in the most appropriate location along the number line.

0.1^2 , 0.05 , -0.5 , $\frac{3}{4}$, -1 , 1^3 , -3 , $-\frac{5}{3}$, 2^1 , $\frac{7}{8}$, $-\frac{1}{2}$, $\frac{12}{12}$, 75% , $-2\frac{2}{6}$

Write 3 different inequalities using the numbers from the number line above using symbols <, >, =, ≤, ≥. *(example: -1 < 1)*
Answers will vary
1.

2.

3.

Write 2 repeating inequalities using the numbers from the number line above using the symbols. <, >, =, ≤, ≥. *(example: -1 ≤ 1 ≤ 2)*
Answers will vary
1

2.

Compare and Order

Name _____ Date _____ Hour _____

Use the two numbers in column one and add, subtract, multiply or divide them according to the heading. Determine whether the answer would result in a true statement.

	sum > 1	**difference < 1**	**product < sum**	**product < quotient**
Example 2 ½ , -3	2 ½ + -3 = - ½ NO	2 ½ - (-3) = 5 ½ NO	(5/2)(-3) = -15/2 = - 7 ½ YES	5/2 ÷ - 3/1 = -5/6 YES
$1\frac{1}{2}, \frac{3}{4}$				
$\frac{2}{3}, \frac{1}{4}$				
$2, \frac{1}{2}$				
$\frac{5}{6}, \frac{7}{8}$				
1, 1				

Compare and Order

Use the two numbers in column one and add, subtract, multiply or divide them according to the heading. Determine whether the answer would result in a true statement.

	sum > 1	**difference < 1**	**product < sum**	**product < quotient**
Example 2 ½ , -3	2 ½ + -3 = - ½ NO	2 ½ - (-3) = 5 ½ NO	(5/2)(-3) = -15/2 = - 7 ½ YES	5/2 ÷ - 3/1 = -5/6 YES
$1\frac{1}{2}, \frac{3}{4}$	1 ½ + ¾ = 2 ¼ YES	1 ½ - ¾ = ¾ YES	1 ½ (¾) = 9/8 YES	1 ½ ÷ ¾ = 2 YES
$\frac{2,}{3}, \frac{1}{4}$	11/12 NO	5/12 YES	$\frac{2}{3} \times \frac{1}{4} - \frac{2}{12}$ NO	2<2 2/3 YES
$2, \frac{1}{2}$	2 ½ YES	1 ½ NO	1 YES	1 < 4 YES
$\frac{5}{6}, \frac{7}{8}$	1 17/24 YES	-1/24 YES	420/576 = 35/48 YES	35/48 < 20/21 YES
1, 1	2 YES	0 YES	1 < 2 YES	1 = 1 NO

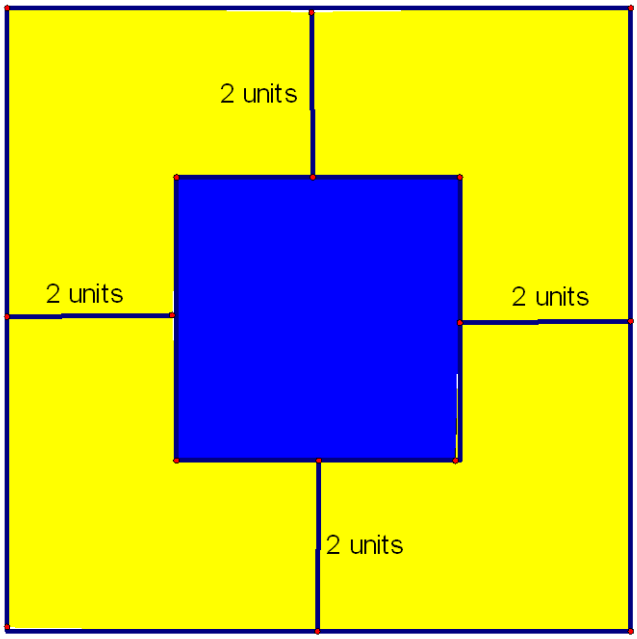
1.5	$-3\frac{1}{2}$	$\sqrt{14}$	2
$\sqrt{21}$	$1.\overline{45}$	$\frac{4}{5}$	-2.2
1.7	$-8.\overline{63}$	$\sqrt{3}$	$-\frac{8}{9}$
4.763	$\sqrt{49}$	$\sqrt{61}$	$-4\frac{5}{6}$
$\sqrt{2}$	$\sqrt{4}$	-5	-0.45

Unit 1, Activity 2, Exploring Squares and Square Roots

Name _____ Date _____ Hour _____

1. Find the area of the smaller square if area of the larger square is 81 square units.

2. Label the side lengths of the large and small square.



3. Justify whether the following statement is *sometimes, always or never* true.

The square of a number is greater than the number.

4. For what number(s) is the number, its square and its square root all equal? Explain your answer.

Real Numbers

A *rational number* is a number that can be represented by $\frac{a}{b}$, where *a* and *b* are integers and b ≠ 0. Rational numbers are sometimes referred to as rationals; this does not mean the same as when a person is referred to as being a "rational person". It means that the numbers represent a ratio. Some examples of rational numbers are $\frac{5}{8}$, $1.\overline{3}$, 7.5, -5, and $\sqrt{9}$.

An *irrational number* is a number that cannot be represented as a fraction. When you divide the circumference of a circle by the diameter, the answer you get is always close to 3, never exactly. This ratio is π (pi) and its value is referred to as an approximation; this is because the exact ratio cannot be written as a ratio, even though the approximation of $\frac{22}{7}$ can be referred to as an approximation of pi. Some examples of irrational numbers are π, 1.233244425555. . ., $\sqrt{5}$

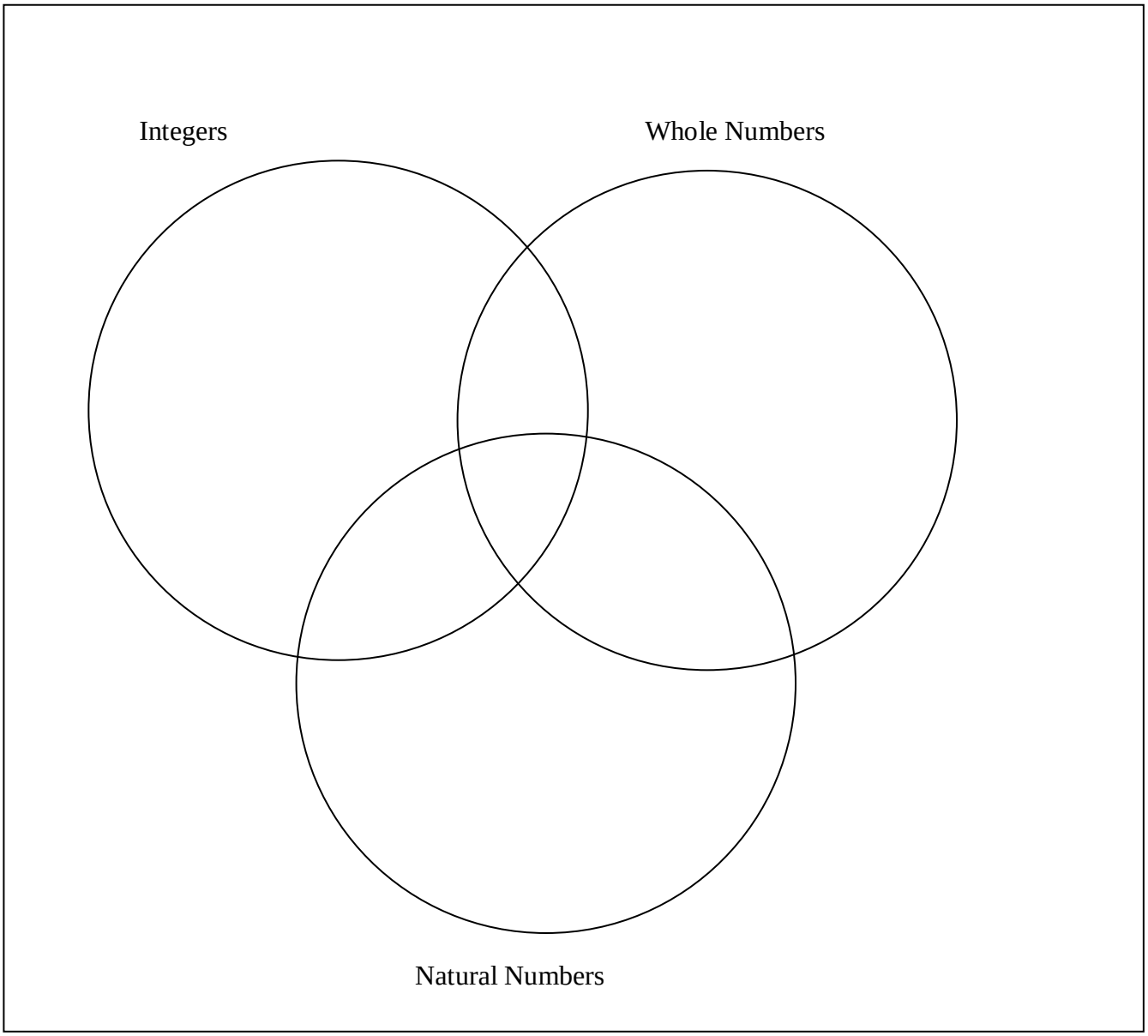
***Natural* or *counting* numbers are the set of numbers used to count objects. {1, 2, 3, 4, 5, . . .}**

***Whole* numbers are natural numbers including zero. {0, 1, 2, 3, 4, 5, . . .}**

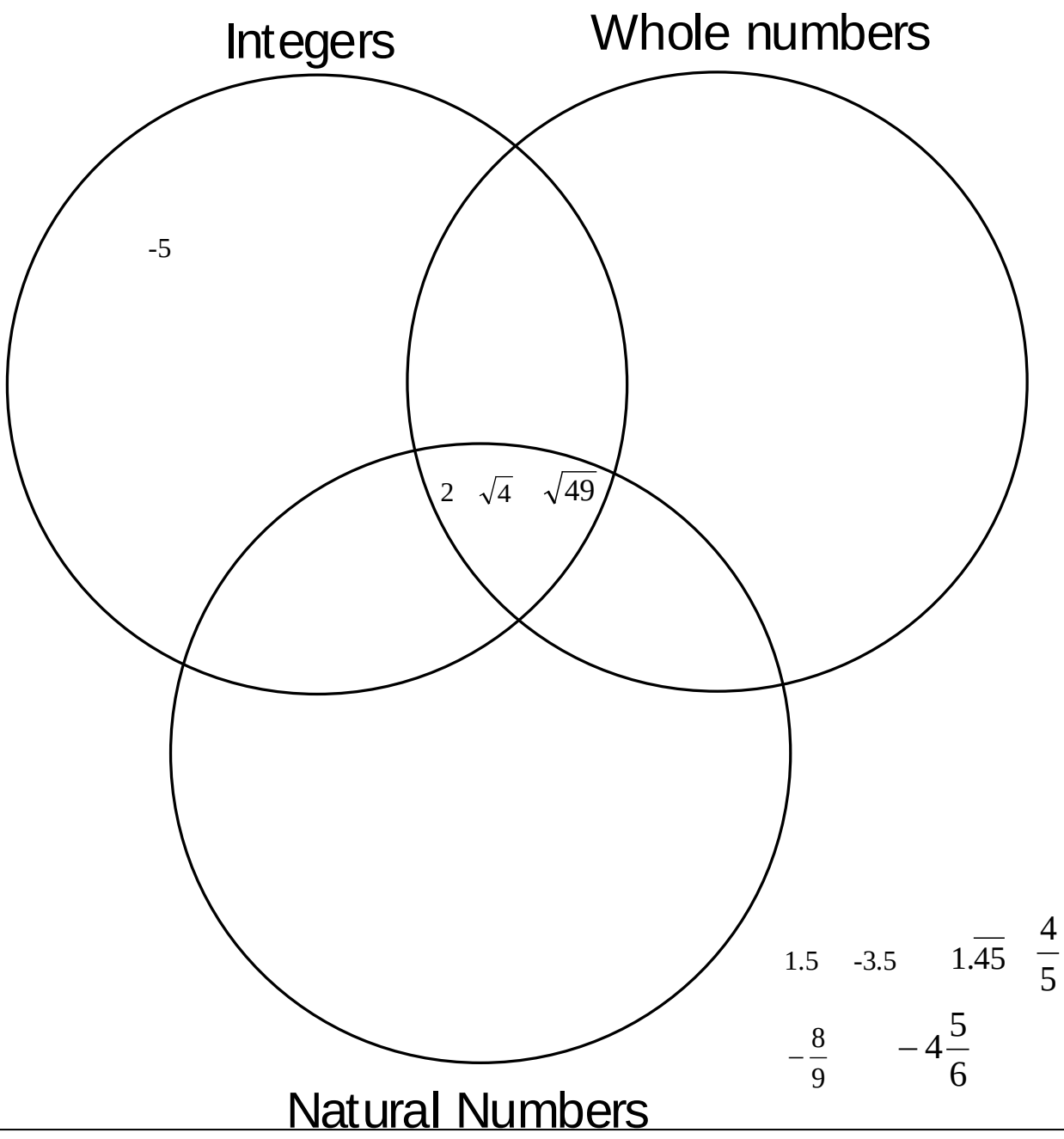
***Integers* are whole numbers and their opposites. {-2, -1, 0, 1, 2, . . .}**

All *rational* and *irrational* numbers form the set of *real numbers.*

Rational Numbers



Rational Numbers



Unit 1, Activity 4, Word Grid

Name _____ Date _____ Section_____

Directions:

Complete the word grid below using "Y" for yes, if the number fits into the category of the type of number and "N" for no if the number does not meet the specifications of type of number.

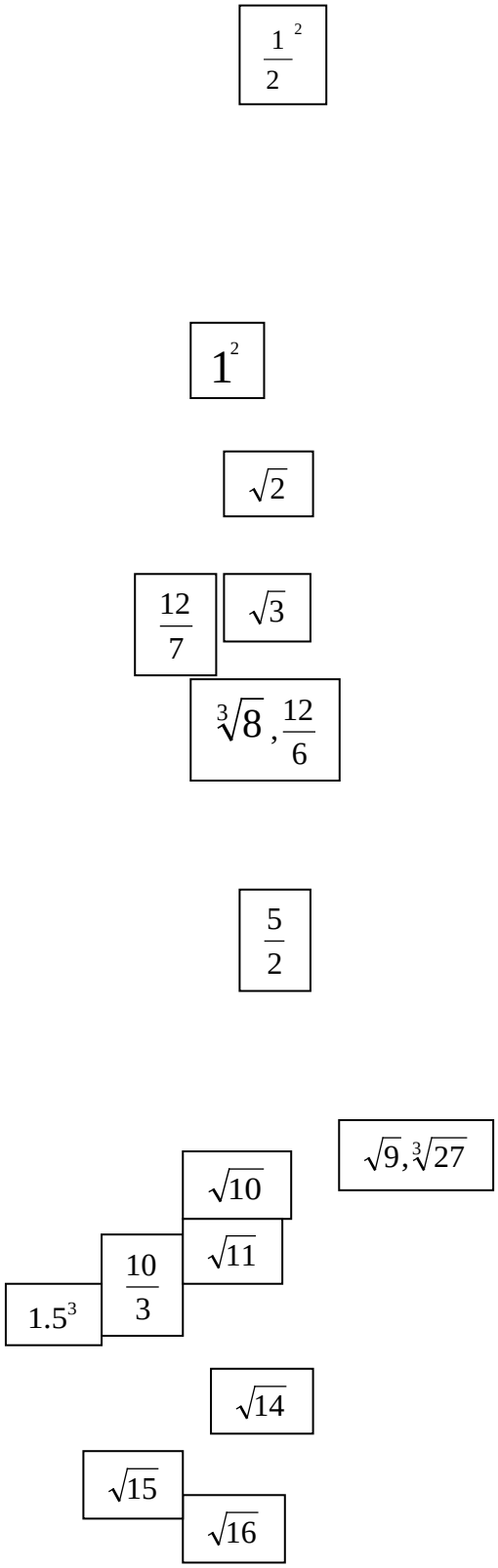
Real Numbers

	$\sqrt{144}$	$\sqrt{2}$	$\frac{1}{3}$	2.3445444. . .	$4.\overline{66}$	$\sqrt{29}$	-54	$-\frac{8}{4}$	5.3
Irrational Number									
Rational Number									
Integer									
Whole Number									
Natural Number									

Unit 1, Activity 4 Word Grid with Answers

	$\sqrt{144}$	$\sqrt{2}$	$\frac{1}{3}$	2.3445444. . .	$4.\overline{66}$	$\sqrt{29}$	-54	$-\frac{8}{4}$	5.3
Irrational Number		√		√		√			
Rational Number	√		√		√		√	√	√
Integer	√						√	√	
Whole Number	√								
Natural Number	√								

$\sqrt{2}$	$\sqrt{15}$	$\sqrt[3]{8}$	$\sqrt{16}$
$\frac{12}{6}$	1^2	$\frac{10}{3}$	$\left(\frac{1}{2}\right)^2$
$\sqrt{3}$	$\sqrt[3]{27}$	$\frac{12}{7}$	$\sqrt{14}$
$\frac{5}{2}$	1.5^3	$\sqrt{11}$	$\sqrt{9}$


$\left(\frac{1}{2}\right)^2$
1^2
$\sqrt{2}$
$\frac{12}{7}$
$\sqrt{3}$
$\sqrt[3]{8}, \frac{12}{6}$
$\frac{5}{2}$
$\sqrt{9}, \sqrt[3]{27}$
$\sqrt{10}$
$\sqrt{11}$
$\frac{10}{3}$
1.5^3
$\sqrt{14}$
$\sqrt{15}$
$\sqrt{16}$

Unit 1, Activity 7, Scientific Notation

Name _____ Date _____ Hour _____

Complete each of the following scientific notation problems.

1. Write 34,000 in scientific notation.

2. Write 8.21×10^5 in standard form.

3. There are approximately 950,000,000 acres of farmland in the United States. Write the number in scientific notation.

4. A house fly is about 1.25×10^{-2} feet long. Write the number in standard form.

5. Sam said that 234,000 would be written as 23.4×10^4 in scientific notation. Explain why Sam is correct or incorrect.

6. What would the correct exponent be for each of the following scientific notation problems?

   a. $130 = 1.3 \times 10^n$ $n =$ _____ *(exponent)*

   b. $0.00087 = 8.7 \times 10^n$ $n =$ _____ *(exponent)*

   c. $87{,}300{,}000 = 8.73 \times 10^n$ $n =$ _____ *(exponent)*

   d. $0.65 = 6.5 \times 10^n$ $n =$ _____ *(exponent)*

Unit 1, Activity 7, Scientific Notation with Answers

Name _____ Date _____ Hour _____

Complete each of the following scientific notation problems.

1. Write 34,000 in scientific notation.

   3.4×10^4

2. Write 8.21×10^5 in standard form.

   821,000

3. There are approximately 950,000,000 acres of farmland in the United States. Write the number in scientific notation.

   9.5×10^8

4. A house fly is about 1.25×10^{-2} feet long. Write the number in standard form.

   0.0125

5. Sam said that 234,000 would be written as 23.4×10^4 in scientific notation. Explain why Sam is correct or incorrect.

   Sam is incorrect because 23 is not between 0 and 9; it should be 2.34×10^5

6. What would the correct exponent be for each of the following scientific notation problems?

   a. $130 = 1.3 \times 10^n$ n = _____*2*_____ *(exponent)*

   b. $0.00087 = 8.7 \times 10^n$ n = _____*-4*_____ *(exponent)*

   c. $87{,}300{,}000 = 8.73 \times 10^n$ n = _____*7*_____ *(exponent)*

   d. $0.65 = 6.5 \times 10^n$ n = _____*-1*_____ *(exponent)*

Unit 1, Activity 8, Trip to Mars

Name_____ Date _____ Hour_____

Complete the following problems using what you have learned about scientific notation.

1. A space craft may someday travel from Earth to Mars. The space researchers estimated the distance of travel from the Earth to Mars when the earth is farthest from the sun to be an estimated distance of 5.6×10^7 kilometers. Write the number in standard form.

2. They also determined that the return would be 6 months after the arrival and the estimated distance in June was 4.01×10^8 kilometers when the earth is closest to the sun. Write the number in standard form.

3. Find the distance of the round trip. Record your answer in scientific notation.

4. The space craft will be designed to have 8,000,000 cubic feet of cargo space. Express the number in scientific notation.

5. It has been estimated that meals for each person on the trip will occupy 0.00098 cubic feet of the available cargo space. The meals for everyone on the trip can only use no more than 5.0×10^{-3} cubic feet of the cargo space. Is this possible if there are 10 people on the trip?

6. The researchers estimate that the cost of the trip is about $500,000 per kilometer. Give the estimated cost of the trip to Mars. Record your answer in scientific notation.

7. Determine whether the SQPL question is true; use information from this page to justify the statement.

Unit 1, Activity 8, Trip to Mars with Answers

Name _____ Date _____ Hour_____

Complete the following problems using what you have learned about scientific notation.

1. A space craft may someday travel from Earth to Mars. The space researchers estimated the distance of travel from the Earth to Mars when the earth is farthest from the sun to be an estimated distance of 5.6×10^7 kilometers. Write the number in standard form.

   56,000,000 km

2. They also determined that the return would be 6 months after the arrival and the estimated distance in June was 4.01×10^8 kilometers when the earth is closest to the sun. Write the number in standard form.

   401,000,000 km

3. Find the distance of the round trip. Record your answer in scientific notation.

   $456{,}000{,}000 = 4.56 \times 10^8$ km

4. The space craft will be designed to have 8,000,000 cubic feet of cargo space. Express the number in scientific notation.

   8.0×10^6 cubic feet

5. It has been estimated that meals for each person on the trip will occupy 0.00098 cubic feet of cargo space. The meals for everyone on the trip can only use no more than 5.0×10^{-2} cubic feet of the cargo space. Is this possible if there are 10 people on the trip?

   $0.00098 \times 10 = 0.0098$ space for food for 10 people

   0.05 cubic feet is allowed, yes there is space.

6. The researchers estimate that the cost of the trip is about $500,000 per kilometer. Give the estimated cost of the trip to Mars. Record your answer in scientific notation.

   $\$500{,}000 \times 401{,}000{,}000 = \$200{,}500{,}000{,}000 = 2.005 \times 10^{14}$
   Two hundred billion, five hundred million dollars

7. Determine whether the SQPL question is true; use information from this page to justify the statement.

   The distance from Earth to Mars changes every minute with the difference between the closest and farthest distance being more than 300,000,000 kilometers is a true statement because there is more than the 300,000,000 kilometers difference.

Unit 1, Activity 9, Powerful Numbers

Use a calculator to fill in the following chart with powers of 10.

10^4	10^3	10^2	10^1	10^0	10^{-1}	10^{-2}	10^{-3}	10^{-4}

From your observations of the chart, what can you conclude about negative exponents?

Use your calculator to find the value of 2^{-1}. Does your conclusion still hold true?

Review: Scientific Notation

Convert the following numbers to correct scientific notation.

23,000

1,345,900,000

56

23.459×10^4

Convert the following numbers in scientific notation to standard form.

2.3×10^5

3.56909×10^3

4.9×10

7.89×10^{11}

Look at the very small numbers below, and find a way to write these numbers in scientific notation. Use the chart you constructed above to help you decide the proper procedure to follow.

.000023

.0004598

.02

.00000000000000004

Convert the following numbers in scientific notation to standard form.

6.7×10^{-5}

3.4×10^{-8}

3.56×10^{-1}

9.08×10^{-6}

Unit 1, Activity 9, Powerful Numbers with Answers

Use a calculator to fill in the following chart with powers of 10.

10^4	10^3	10^2	10^1	10^0	10^{-1}	10^{-2}	10^{-3}	10^{-4}
10000	*1000*	*100*	*10*	*1*	*.1*	*.01*	*.001*	*.0001*

From your observations of the chart, what can you conclude about negative exponents? *Answers will vary. Ex: Negative exponents produce decimals/fractions*

Use your calculator to find the value of 2^{-1}. Does your conclusion still hold true?

$2^{-1} = \frac{1}{2}$ *yes*

Review: Scientific Notation

Convert the following numbers to correct scientific notation.

23,000 = 2.3×10^4 1,345,900,000 = 1.3456×10^9

56 = 5.6×10^1 $23.459 \times 10^4 = 2.3459 \times 10^5$

Convert the following numbers in scientific notation to standard form.

$2.3 \times 10^5 = 230{,}000$ $3.56909 \times 10^3 = 3569.09$

$4.9 \times 10 = 49$ $7.89 \times 10^{11} = 789{,}000{,}000{,}000$

Look at the very small numbers below, and find a way to write these numbers in scientific notation. Use the chart you constructed above to help you decide the proper procedure to follow.

.000023 = 2.3×10^{-5} .0004598 = 4.598×10^{-4}

.02 = 2×10^{-2} .00000000000000004 = 4.0×10^{-17}

Convert the following numbers in scientific notation to standard form.

$6.7 \times 10^{-5} = .000067$ $3.4 \times 10^{-8} = .000000034$

$3.56 \times 10^{-1} = .356$ $9.08 \times 10^{-6} = .00000908$

Exponential Growth and Decay

In this activity, fold a piece of computer paper in half as many times as possible. After each fold, stop to fill in a row of the table. Continue folding and recording until the table is filled.

NUMBER OF FOLDS	NUMBER OF REGIONS	AREA OF SMALLEST REGION
0		
1		
2		
3		
4		
5		
6		
7		
N		

1. Explain how the number of regions increases with each fold of the paper.

2. Is the relationship of the number of folds and the number of regions linear? Explain.

3. How does the relationship of the number of folds and the area of the smallest region differ from the comparison in #2?

4. If you were to graph these comparisons, which would be the independent and dependent variable in each comparison? Explain.

Exponential Growth and Decay

In this activity, fold a piece of computer paper in half as many times as possible. After each fold, stop to fill in a row of the table. Continue folding and recording until the table is filled

NUMBER OF FOLDS	NUMBER OF REGIONS	AREA OF SMALLEST REGION
0	1	1
1	2	$\frac{1}{2}$ or 2^{-1}
2	4	$\frac{1}{4}$ or 2^{-2}
3	8	$\frac{1}{8}$ or 2^{-3}
4	16	$\frac{1}{16}$ or 2^{-4}
5	32	$\frac{1}{32}$ or 2^{-5}
6	64	$\frac{1}{64}$ or 2^{-6}
7	128	$\frac{1}{128}$ or 2^{-7}
N	2^n	$\frac{1}{2^n}$ or 2^{-n}

1. Explain how the number of regions increases with each fold of the paper.
   The number of regions doubles with each fold

2. Is the relationship of the number of folds and the number of regions linear? Explain.
   The relationship is not linear because the rate of change is not constant

3. How does the relationship of the number of folds and the area of the smallest region differ from the comparison in #2?
   The relationship between the two shows a decrease in the size of each small area after each fold becomes half the size of the previous.

4. If you were to graph these comparisons, which would be the independent and dependent variable in each comparison? Explain.
   Since the number of folds determines the number of regions or the area of the smallest region, the number of folds is independent and either the regions or area is dependent.

Unit 1, Activity 11, Vocabulary Awareness

Name _____ Date _____ Hour _____

Word- Properties of Powers	+	✓	-	Example	Definition
Product of Powers					
Quotient of Powers					
Power of a Power					
Power of zero					
Product of a Power					
Power of a quotient					

Word- Properties of Powers	+	✓	-	Example	Definition
Product of Powers				$x^m \times x^p$ $x^{(m+p)}$ $3^2 \times 3^5 = 3^{(2+5)}$ $(3 \times 3) \times (3 \times 3 \times 3 \times 3 \times 3)$ $3^7 = 2{,}187$	*If numbers with exponents have the same base are multiplied, the exponents are added.*
Quotient of Powers				$n^m \div n^r$ $n^{(n-r)}$ $5^6 \div 5^5 = 5^{(6-5)}$ $\frac{5 \times 5 \times 5 \times 5 \times 5 \times 5 \times 5}{5 \times 5 \times 5 \times 5 \times 5 \times 5}$ 5^1	*If numbers with exponents have the same base are divided, the exponents are subtracted.*
Power of a Power				$(n^r)^t$ n^{rt} $(4^2)^3 = 4^{(2 \times 3)}$ $(4 \times 4)^3$ $(16)^3$ $4{,}096$	*If numbers are raised to a power and then this is raised to a power, the exponents are multiplied.*
Power of zero				$n^0 = 1$ *if* $n \neq 0$ $8^0 = 1$ $10^0 = 1$	*If a nonzero number is raised to the zero power, it equals 1.*
Product of a Power				$(ab)^r$ $a^r b^r$ $(4 \times 3)^2$ $4^2 \times 3^2 = 16 \times 9 = 144$	*If factors are raised to a power and the product is raised to a power, find the power of each factor and multiply.*
Power of a quotient				$\left(\frac{m}{n}\right)^x = \frac{m^x}{n^x}$ if $n \neq 0$ $\left(\frac{3}{2}\right)^3 = \frac{3^3}{2^3} = \frac{27}{8}$	*If a quotient of two numbers is raised to a power, raise both the numerator and the denominator to that power and simplify.*

Name _____ Date _____ Hour_____

Use your understanding of exponents and their properties to complete these problems.

1. What is 37^0? _____ Which property did you use?
2. What is $2^3 \times 2^4$? _____ Which property did you use?
3. What is $5^3 \times 5^{-3}$? _____ Which property did you use?
4. What is $6^2 \times 6^{-3}$? _____ Show your work and describe the property used.
5. What is $\left(\frac{3}{6}\right)^3$? _____ Show your work and describe the property used.
6. What is $\left(\frac{34}{45}\right)^0$? _____ Show your work and describe the property used.
7. What is $\left(\frac{5}{10}\right)^2$?_____ Show your work and describe the property used.
8. Write a problem that illustrates the power of a power and explain how you would solve the problem.
9. This problem has a base of 3 and exponents of 3 and 4. The problem illustrates the product of powers. Write the problem.
10. Explain the difference in the product of powers property and the power of a product property.

Unit 1, Activity 11, Exponent with Answers

Use your understanding of exponents and their properties to complete these problems.

1. What is 37^0? _____1_____ Which property did you use? *Power of zero*

2. What is $2^3 \times 2^4$? ____$2^{3+4} = 2^7$ = _128_____ Which property did you use? *Product of powers*

3. What is $5^3 \times 5^{-3}$? __$5^{(3+-3)}$ ___= 5^0 =1__ Which property did you use? *Product of powers and Power of zero*

4. What is $(6^2)^{-1}$? ___$6^{2(-1)} = 6^{-2}$ =__$\frac{1}{6^2} = \frac{1}{36}$_____ Show your work and describe the property used. *Power of a product*

5. What is $\left(\frac{3}{6}\right)^3$? __$\frac{3^3}{6^3} = \frac{3x3x3}{6x6x6} = \frac{27}{216} = \frac{1}{8}$_____ Show your work and describe the property used. *Power of a quotient*

   or

   $\frac{3x3x3}{6x6x6} = \frac{1x1x1}{2x2x2} = \frac{1}{8}$

6. What is $\left(\frac{34}{45}\right)^0$? _____1_____ Show your work and describe the property used.

   No work necessary; purpose of the problem is to reinforce the power of zero property

7. Write a problem that illustrates the power of a power and explain how you would solve the problem.

   Various answers possible

8. This problem has a base of 3 and exponents of 3 and 4. The problem illustrates the product of powers. Write the problem.

   $3^3 x\ 3^4$ resulting in 3^7 product of powers
   or possibly $(3^3)^4$ resulting in 3^{12} power of a product

9. Explain the difference in the product of powers property and the power of a product property. *For the product of powers, the exponents are added and for the power of a product, the exponents are multiplied.*