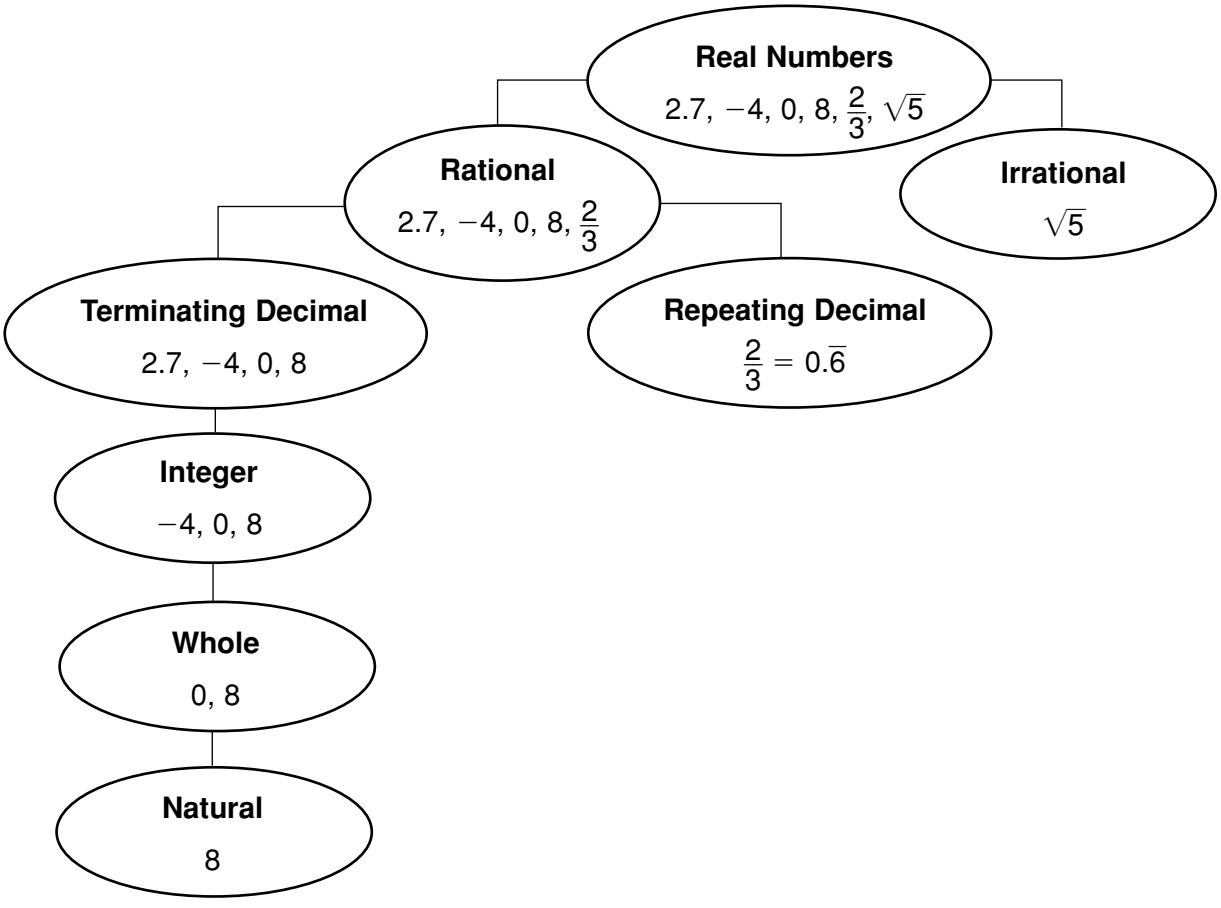
Name _____ Date _____ Class _____

LESSON 1-5

Reading Strategies

Understanding Relationships

The flow chart below can help you understand the relationships among different subsets of the real numbers.



Answer true or false for each statement.

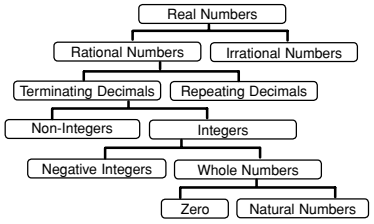
1. Real numbers are either rational or irrational. _____
2. An irrational number can be a repeating decimal. _____
3. Whole numbers include negative numbers. _____
4. The number 12 is an integer. _____
5. The only integer not included in the natural numbers is 0. _____
6. Irrational numbers are not real numbers. _____
7. The fraction $\frac{1}{2}$ can be written as a terminating decimal. _____
8. All integers are rational numbers. _____

LESSON 1-5

Reteach

Square Roots and Real Numbers continued

This flowchart shows the subsets of the real numbers and how they are related. To identify the classifications of a real number, start at the top and work your way down.



Write all of the classifications that apply to the real number –4.

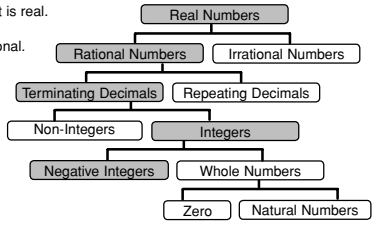
−4 can be shown on a number line. It is real.

−4 can be written as $-\frac{4}{1}$ so it is rational.

Its decimal representation terminates: $-4 = -4.0$.

−4 is an integer.

−4 is a negative integer. Stop. There are no more subsets in the chart below negative integers.



−4: real number, rational number, terminating decimal, integer

Write all classifications that apply to each real number.

9. 24 — real number, rational number, terminating decimal, integer, whole number, natural number
10. $\frac{1}{3}$ — real number, rational number, repeating decimal
11. $\sqrt{5}$ — real number, irrational number

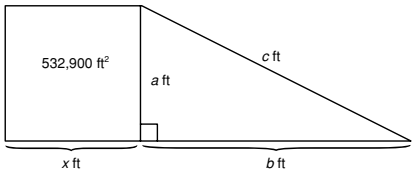
LESSON 1-5

Challenge

How Much Fencing is Needed?

A farmer wishes to raise alpacas. The alpaca is related to the llama and is best known for its fleece. Alpacas can be prey for dogs, wolves and coyotes, so it is important to build a fence around any alpaca farm.

The farmer currently owns a plot of land in the shape of a square. He knows that the land measures 532,900 square feet. To give the alpacas more room to graze, he buys an adjacent plot of land, which is in the shape of a right triangle. Both plots of land are shown below.



The side labeled *b* ft has a length of 700 feet greater than the side labeled *x* ft. The farmer needs to determine the perimeter so he can build a fence.

Complete the steps below to find how much fencing the farmer needs.

1. Find the value of *x*. 730
2. Find the value of *a*. 730
3. Find the value of *b*. 1430

The equation $a^2 + b^2 = c^2$ relates the lengths of the sides of a right triangle.

4. Find the value of a^2. 532,900
5. Find the value of b^2. 2,044,900
6. Find the value of $a^2 + b^2$. 2,577,800 (This is c^2.)
7. Find the value of *c*. Round to the nearest whole number. 1606
8. Find the perimeter of the land. 5226 ft
9. How much fencing does the farmer need? 5226 ft

LESSON 1-5

Problem Solving

Square Roots and Real Numbers

1. Jack is building a square pen for his dog. If he wants the area of the pen to be 121 square feet, how long should he make each side of the pen?

   11 ft

2. Danny needs a square-shaped picture to cover a hole in his wall. It has to cover at least 441 square inches of wall space. What is the smallest side length the picture can have?

   21 in.

3. The Statue of Liberty, which sits on Liberty Island in New York Harbor, is 151 $\frac{1}{12}$ feet high, from base to torch. Write all classifications that apply to 151 $\frac{1}{12}$: natural, whole, integer, rational, terminating decimal, repeating decimal, and irrational.

   rational number
   repeating decimal

4. A square note card has an area of 5 in^2. Estimate the length of the side to the nearest tenth. Then write all classifications that apply to the actual side length: natural, whole, integer, rational, terminating decimal, repeating decimal, and irrational.

   2.2
   irrational

Use the table below to answer questions 5–7, which shows the area of four sizes of square-shaped pizzas sold at Town Pizza. Complete the table by finding the length of each side of the four pizzas. Round to the nearest tenth if needed. Select the best answer.

Pizza Size	Area (in^2)	Side length (in.)
Small	100	10
Medium	200	14.1
Large	420.25	20.5
Extra Large	576	24

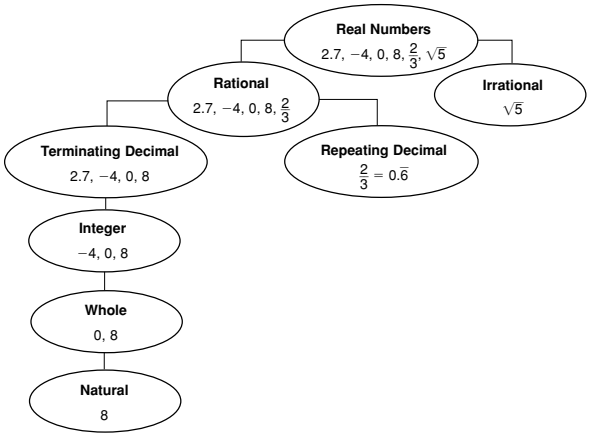
5. What is the length of each side of an extra large pizza?
   (A) 24 in. C 26 in.
   B 25 in. D 36 in.
6. Which of the following classifications applies to the length of each side of a large pizza?
   F natural H integer
   G whole (J) rational
7. Which of the following is NOT a classification for the length of each side of a small pizza?
   A whole C rational
   (B) irrational D integer

LESSON 1-5

Reading Strategies

Understanding Relationships

The flow chart below can help you understand the relationships among different subsets of the real numbers.



Answer true or false for each statement.

1. Real numbers are either rational or irrational. true
2. An irrational number can be a repeating decimal. false
3. Whole numbers include negative numbers. false
4. The number 12 is an integer. true
5. The only integer not included in the natural numbers is 0. false
6. Irrational numbers are not real numbers. false
7. The fraction $\frac{1}{2}$ can be written as a terminating decimal. true
8. All integers are rational numbers. true