lesson four - student resource sheet

Lesson Objective: Find exact or approximate square roots of numbers, and classify real numbers (rational, irrational, integers, whole, natural).

Vocabulary Box

real numbers – The combined set of rational numbers and irrational numbers. Examples: –22, 0, 100, $\sqrt{2}$, $\frac{3}{4}$.

natural numbers – The counting numbers. Examples: 1, 2, 3, and so on.

whole numbers – The set of numbers that includes 0 and all of the natural numbers. Examples: 0, 1, 2, 3, and so on.

integers – The set of numbers containing 0, the natural numbers, and all the negatives of the natural numbers. Examples: –3, –2, –1, 0, 1, 2, 3, and so on.

rational numbers – Numbers that can be expressed as the ratios of two integers. Examples: 5, –2, $\frac{3}{7}$, $4\frac{1}{2}$, 0.25, 15%.

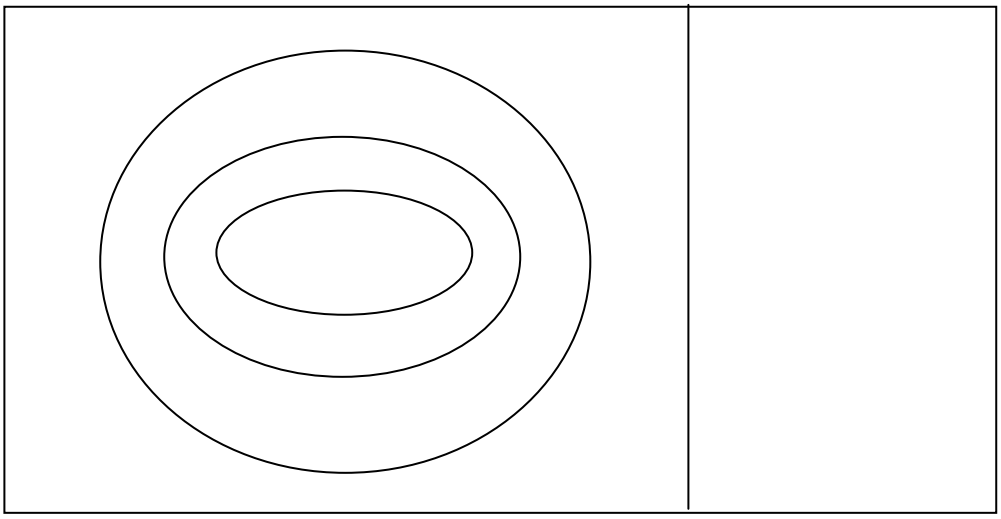
irrational numbers – Numbers that cannot be expressed as the ratios of two integers. Examples: π, $\sqrt{5}$ (but not $\sqrt{9}$, which is 3 or -3).

square root – For *x,* the number that, when multiplied by itself, gives the number *x*. Examples: $\sqrt{100} = 10$, $\sqrt{100} = -10$, $\sqrt{8} \approx 2.83$.

Independent Practice

Complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.

Directions: Correctly place the following sets of numbers in the Venn diagram below: natural numbers, whole numbers, integers, rational number, irrational numbers.



All of the numbers in the Venn diagram are real numbers.

Directions: Now place each of the following numbers in the appropriate region of the Venn diagram.

1. 65%
2. –8
3. $\frac{9}{5}$
4. 0
5. 1
6. π

7. $\sqrt{8}$

8. $\sqrt{9}$

9. $0.8\overline{3}$

Directions: Approximate each square root to the nearest tenth.

1. $\sqrt{40}$

2. $\sqrt{11}$

1. Approximate $\sqrt{54}$ to the nearest hundredth.

2. Now, approximate it to the nearest thousandth.

Problem Solving

Zeeshan wants to make a map of his town. He wants to determine how many miles away certain places are from his house. He decides to map out his town using a grid. Use the information below to help him.

1. Using the sheet of grid paper on the next page, draw a coordinate plane with x- and y-axes. The x-axis represents east (positive direction) and west (negative direction). The y-axis represents north (positive direction) and south (negative direction). Each gridline represents one mile.

2. Zeeshan's town is made up of square blocks, with his house located at the origin. Place a point at the origin and label it HOME.

3. Zeeshan's school is located one mile east and two miles north of his house. Plot this point on the grid and label it SCHOOL.

4. To determine how far Zeeshan's school is from his house, use the distance formula. The distance formula is: distance = $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$. The formula tells us to subtract the x-values of each point and then square the result. Then, subtract the y-values of each point and square the result. Next, add these two numbers together, and then take the square root. For the distance between home and school, the formula would *look* like this: $\sqrt{(1-0)^2 + (2-0)^2} = \sqrt{1^2 + 2^2} = \sqrt{1+4} = \sqrt{5}$. Estimate the value of $\sqrt{5}$ to determine how far the school is from Zeeshan's house.

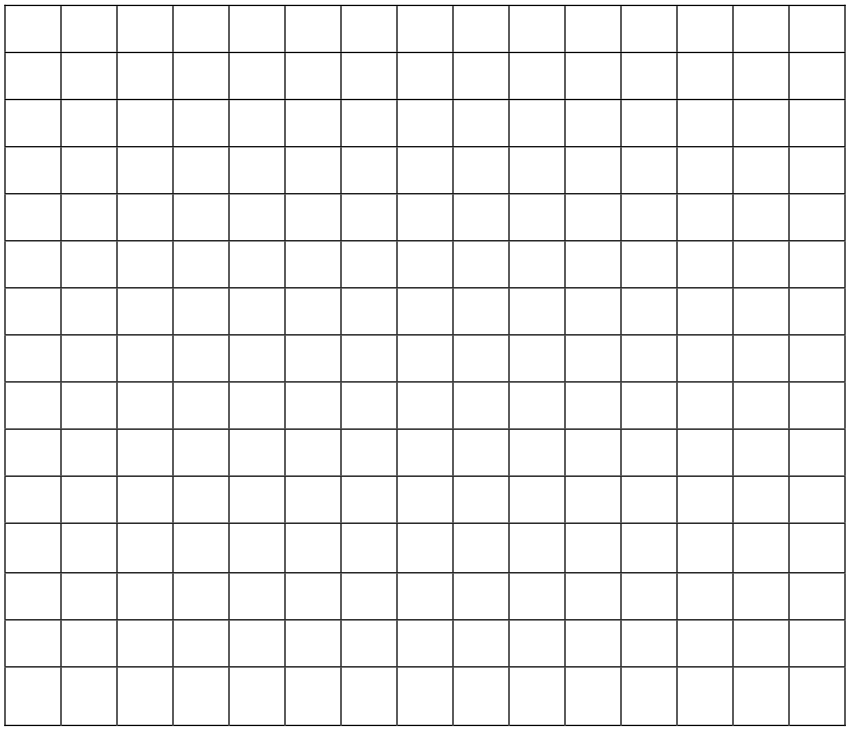
5. The grocery store is 2 miles east and 3 miles north of Zeeshan's house. Plot this point on the grid and label it STORE.

6. Use the distance formula to estimate the distance from Zeeshan's house to the store.

7. Zeeshan's best friend, Shaunda, lives 3 miles west and 4 miles north of Zeeshan's house. Plot this point on the grid and label it SHAUNDA.

8. Use the distance formula to determine the distance from Zeeshan's house to Shaunda's house.

Challenge: Determine the distance from Shaunda's house to the school.



1. Name a rational number that is not an integer.

2. Name an irrational number other than π.

3. Approximate $\sqrt{60}$ to the nearest tenth.

lesson five - student resource sheet

Lesson Objective: Evaluate algebraic expressions for a given replacement set to include integers and rational numbers. (Include expressions with exponents.)

Vocabulary Box

evaluate – Substitute number values into; find a numerical expression for. Example: $\frac{x}{5}+\frac{3}{4}$ evaluated for $x = 8$ is equal to $\frac{47}{20}$.

Guided Practice

You will complete the following practice problems with your partner. Then your teacher will review the answers. Make sure that you show all important work.

Directions: Evaluate each expression for the given value.

1. Evaluate $2 - w$ for $w = \frac{9}{4}$.

2. Evaluate $\frac{3}{2} - x$ for $x = -\frac{5}{7}$.

3. Evaluate $-\frac{2}{3}y - \frac{1}{8}$ for $y = \frac{1}{6}$.

4. Evaluate z^3 for $z = -\frac{2}{7}$.

Summary/Closure

A. Vocabulary Words

1. Write a definition for the word *evaluate.*

2. What is the root of the word *evaluate*? How does that help you remember the definition?

B. Summarize What We Learned Today

Directions: Write three sample problems like the ones that we studied today. Be sure to include negative numbers, fractions, and exponents. Then write a few sentences explaining how to evaluate algebraic expressions for a given replacement set to include integers and rational numbers, including expressions with exponents. You will use this explanation as a reference.

lesson six - student resource sheet

Lesson Objective: Evaluate algebraic expressions for a given replacement set to include integers and rational numbers. (Include expressions with exponents.)

Vocabulary Box

evaluate – Substitute number values into; find a numerical expression for. Example: $\frac{x}{5}+\frac{3}{4}$ evaluated for $x = 8$ is equal to $\frac{47}{20}$.

Independent Practice

Complete the following practice problems on your own. Your teacher will review the answers. Make sure that you show all of your work.

Directions: Evaluate each expression for the given value.

1. Evaluate $u-\frac{2}{3}$ for $u = -\frac{3}{2}$

2. Evaluate $2v+\frac{5}{4}$ for $v = -1\frac{1}{2}$

3. Evaluate $\frac{1}{9}-w$ for $w = -\frac{7}{6}$

4. Evaluate $6\frac{2}{3}x$ for $x = -1\frac{1}{5}$

5. Evaluate $-7\frac{1}{4}-3y$ for $y = -\frac{1}{2}$

6. Evaluate z^3 for $z = -\frac{6}{5}$

7. Evaluate a^4 for $a = -\frac{3}{4}$

8. Evaluate kmn for $k = -\frac{2}{9}$, $m = -\frac{8}{3}$, and $n = \frac{15}{32}$

Directions: Evaluate each expression for the given value.

1. Evaluate $c^2 - d^2$ for $c = -\frac{2}{3}$ and $d = -\frac{2}{5}$

2. Evaluate $(x + y)(w + z)$ for $w = -\frac{1}{2}$, $x = -2$, $y = -\frac{3}{4}$, and $z = 3$

Problem Solving

Bull's-eye!

For each problem, choose the correct "arrow" that when substituted for *x* in the "bow" will come closest to the "target." As you work, try to use problem-solving strategies that will decrease the amount of unnecessary work that you have to do. Make a note of those strategies.

Problem	Arrows	Bow	Target
1	–39, –13, 0, 26	$-3x + 52$	156
2	5.12, 8.89, 12.35, 17.92	x^3	700
3	$\frac{2}{3}, \frac{5}{3}, \frac{8}{3}, \frac{11}{3}$	$\frac{9}{8}x + \frac{81}{80}$	5
4	$-82\frac{6}{11}, -29\frac{1}{12}, 9\frac{1}{2}, 41\frac{9}{10}$	$x - \frac{1}{3}x$	–20

Directions: Evaluate each expression for the given value.

1. Evaluate $9 - a$ for $a = \frac{27}{2}$

2. Evaluate $-\frac{4}{3}b$ for $b = -2\frac{2}{9}$

3. Evaluate c^4 for $c = -\frac{5}{2}$