GreatHearts®

Algebra 9:

April 20 - 24

Time Allotment: 40 minutes per day

Student Name: _____

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Chapter 11: Rational and Irrational Numbers

Packet Overview

Date	Objective(s)	Page Number
Monday, April 20	Chapter 11-1: Be able to learn and apply some properties of rational numbers.	2-5
Tuesday, April 21	Chapter 11-2: Be able to express rational numbers as decimals and fraction.	6-7
Wednesday, April 22	Chapter 11-3: Be able to find the square roots of numbers that have rational square roots. **Quiz Tomorrow on 11: 1-2**	8-11
Thursday, April 23	**Quiz on 11: 1-2** Chapter 11-3 Continued: Be able to find the square roots of numbers that have rational square roots.	12-13 14
Friday, April 24	No school	

Additional Notes:

- **Materials:** Printed packet or notebook paper; pencils. (Calculators ARE needed).
  - **Note:** If you are using notebook paper, be sure to write the pages and numbers of the material.
  - **Example:** P. 6; #1) _____
- **Answers of odd problems are in the back of the book. Other answers will be provided at the end of each lesson.**
- **Quiz:** Located on pages 12-13. This should be taken ***without*** looking at previous work. No answers are provided for the quiz.

Academic Honesty

I certify that I completed this assignment independently in accordance with the GHNO Academy Honor Code.

Student signature:

_____

I certify that my student completed this assignment independently in accordance with the GHNO Academy Honor Code.

Parent signature:

_____

Algebra Unit: Chapter 11 Rational and Irrational Numbers

Unit Overview: Rational and Irrational Numbers

We are now starting Chapter 11, Rational and Irrational Numbers. In this chapter, you will:

1) Properties of Rational Numbers
2) Decimal Forms of Rational Numbers
3) Rational Square Roots
4) Irrational Square Roots
5) Square Roots of Variable Expressions
6) The Pythagorean Theorem
7) Multiplying, Dividing, and Simplifying Radicals
8) Adding and Subtracting Radicals
9) Multiplication of Binomials Containing Radicals
10) Simple Radical Equations

Monday, April 20

Lesson 11-1: Properties of Rational Numbers

Objective: Be able to learn and apply some properties of rational numbers.

- Here is a quick review of some vocabulary:

Rational Numbers	**Irrational Numbers**
CAN be written as FRACTIONS! $5 = \frac{5}{1}$ $\frac{2}{3}$ $1.25 = 1\frac{1}{4} = \frac{5}{4}$ $0.333\ldots = \frac{1}{3}$	***CANNOT*** be written as FRACTIONS! $\sqrt{5}$ π
INTEGERS = …-3, -2, -1, 0, 1, 2, 3… NO FRACTIONS OR DECIMALS! For all integers a and b and all positive integers c and d:	
$\frac{a}{c} > \frac{b}{d}\ if\ and\ only\ if\ ad > bc$	$\frac{a}{c} < \frac{b}{d}\ if\ and\ only\ if\ ad < bc$

So, what did that a and b thing above mean?

To determine if fractions are $<, =,$ *or* $>$,
you can find common denominators and compare or cross multiply.

Example 1:

$\frac{5}{8}$? $\frac{3}{4}$ x2 x2

$\frac{5}{8}$? $\frac{6}{8}$ ← common denom.

$\frac{5}{8} < \frac{6}{8}$

Example 2:

(4)(5)=20 (8)(3)=24 bigger

$\frac{5}{8}$? $\frac{3}{4}$

(4)(5) ? (8)(3)

$20 < 24$

SO

$\frac{5}{8} < \frac{3}{4}$

2)

$\frac{11}{15}$? $\frac{2}{3}$

4)

$-\frac{7}{8}$? $-\frac{5}{6}$

$\frac{-7\times3}{8\times3}$ $\frac{-5\times4}{6\times4}$

$\frac{-21}{24} < \frac{-20}{24}$

$\frac{-7}{8} < \frac{-5}{6}$

-56 -40

$\frac{-7}{8}$ $\frac{-5}{8}$

$-56 < -40$

so

$\frac{-7}{8} < \frac{-5}{6}$

6) $\frac{12}{19} \; ? \; \frac{17}{24}$

common denominator 11

288 323

$\frac{12}{19} < \frac{17}{24}$

8) $-\frac{214}{14} \; ? \; -15\frac{2}{3}$

-214×3 $\quad -47 \times 14$

Answers: 2) > 8) >

- The next section wants you to "arrange each group of numbers in order from least to greatest." I find, when there are more than two fractions, that it is easier to change them all into decimals, unless it is easy to find the common denominators.
- Arrange each group of numbers from least to

Example with common denominator:	Example with decimals:
$\frac{3}{5}, \frac{1}{2}, \frac{3}{4}$	$\frac{3}{5}, \frac{1}{2}, \frac{3}{4}$
$\frac{3}{5} \; \frac{x4}{x4} = \frac{12}{20}$	$\frac{3}{5} = 3 \div 5 = 0.6$
$\frac{1}{2} \; \frac{x10}{x10} = \frac{10}{20}$ Least	$\frac{1}{2} = 1 \div 2 = 0.5$
$\frac{3}{4} \; \frac{x5}{x5} = \frac{15}{20}$ Greatest	$\frac{3}{4} = 3 \div 4 = 0.75$
$\frac{1}{2}, \frac{3}{5}, \frac{3}{4}$	$\frac{1}{2}, \frac{3}{5}, \frac{3}{4}$

- Here are some more for you! P. 510:

3)	5)
7)	9)
11)	13)

- Great! Now be sure to check the answers in the back of the text and correct your work!

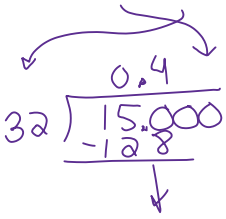
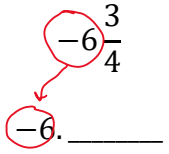
Tuesday, April 21

Algebra Unit: Rational and Irrational Numbers

Lesson 11-2: Decimal Forms of Rational Numbers

Objective: Be able to express rational numbers as decimals and fraction.

- Today we are turning fractions into decimals and decimals into fractions.
- YOU MAY USE A CALCULAR 😊
- Turn to page 514

10)	14)
$-\frac{15}{32}$ $-15 \div 32 =$  Yes, you can use the calculator 😊. Answer: 0.46875	 $3 \div 4 = 0.75$ Answer: -6.75

- Now let us change decimals into fractions.
- Here are some reminders first: $0.3 = \frac{3}{10}$ (tenths) $\quad 0.03 = \frac{3}{100}$ (hundredths; 2 #'s, 2 zeros) $\quad 0.003 = \frac{3}{1000}$ (thousandths; 3 #'s, 3 zeros)
- Turn to p. 515:

18)	20)
0.66 $\frac{66}{100}$ ÷2 ÷2 $\frac{33}{50}$	3.8 $3\frac{8}{10}$ ÷2 ÷2 $3\frac{4}{5}$

- Complete p. 515 #'s 5 – 19 odd and check the answers in the back of the text.

5)	7)
9)	11)
13)	15)
17)	19)

Wednesday, April 22

Algebra Unit: Rational and Irrational Numbers

Lesson: 11-3: Rational Square Roots

Objective: Be able to find the square roots of numbers that have rational square roots.

- Remember:
  - Subtraction undoes addition
    - $2 + 5 = 7 \qquad 7 - 5 = 2$
  - Division undoes multiplication
    - $2 \times 5 = 10 \qquad 10 \div 5 = 2$
  - Square roots undo squaring a number
    - $5^2 = 25 \qquad \sqrt{25} = 5$
- Here are a few things to know before we start:

Product (Multiplication) Property of Square Roots	Quotient (Division) Property of Square Roots
$\sqrt{ab} = \sqrt{a} \cdot \sqrt{b}$ You may know this answer without breaking it down, however, sometimes it is easier to break it down into smaller numbers of which you can take the square root. $\sqrt{400}$ $\sqrt{4} \cdot \sqrt{100}$ $2 \cdot 10$ 20	$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$ $\sqrt{\frac{25}{81}} = \frac{\sqrt{25}}{\sqrt{81}} = \frac{5}{9}$

- Today's work will be from page 519.
- You can use calculators but…SHOW STEPS PLEASE!!! WHY???
- I assure you, in the next sections, it will be clear why these details need to be shown!

4) $\sqrt{121}$

$\sqrt{11 \cdot 11}$

$\sqrt{11^2}$

11

6) $-\sqrt{196}$

OR $-\sqrt{14 \cdot 14}$ $-\sqrt{14^2}$ -14

$-\sqrt{2 \cdot 98}$

$-\sqrt{2 \cdot 2 \cdot 49}$

$-\sqrt{2 \cdot 2 \cdot 7 \cdot 7}$

$-\sqrt{2^2 \cdot 7^2}$

$-\sqrt{2^2} \cdot \sqrt{7^2}$

$-2 \cdot 7$

-14

8) $\sqrt{576}$

$\sqrt{2 \cdot 288}$

$\sqrt{2 \cdot 2 \cdot 144}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 72}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 36}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 18}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 9}$

$\sqrt{2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 2 \cdot 3 \cdot 3}$

$\sqrt{2^2 \cdot 2^2 \cdot 2^2 \cdot 3^2}$

$\sqrt{2^2} \cdot \sqrt{2^2} \cdot \sqrt{2^2} \cdot \sqrt{3^2}$

$2 \cdot 2 \cdot 2 \cdot 3$

$8 \cdot 3$

24

shorter way $\sqrt{2 \cdot 2 \; 12 \; 12}$ $\sqrt{2^2 \; 12^2}$ $\sqrt{2^2}$ $\sqrt{12^2}$ $2 \; 12$ 24

10) $\pm\sqrt{1225}$

$\pm\sqrt{5 \cdot 245}$

$\pm\sqrt{5 \cdot 5 \cdot 49}$

$\pm\sqrt{5 \cdot 5 \cdot 7 \cdot 7}$

$\pm\sqrt{5^2 \cdot 7^2}$

$\pm\sqrt{5^2} \cdot \sqrt{7^2}$

$\pm 5 \cdot 7$

± 35

Check:

$(35)(35) = 1225$

$(-35)(-35) = 1225$

- Now we will look at the next even problems on p. 519 that involve fractions.

12) $-\sqrt{\frac{225}{49}}$

$$-\frac{\sqrt{225}}{\sqrt{49}}$$

$$-\frac{\sqrt{15^2}}{\sqrt{7^2}}$$

$$-\frac{15}{7}$$

16) $\sqrt{\frac{529}{576}}$

What if there was no handy calculator and you could not figure out how to break these down? Estimate and try...

$$(20)(20) = 400$$
$$(21)(21) = 441$$
$$(22)(22) = 484$$
$$\mathbf{(23)(23) = 529}$$
$$(24)(24) = 576$$

$$\frac{\sqrt{\mathbf{23^2}}}{\sqrt{\mathbf{24^2}}}$$

$$\frac{23}{24}$$

- Continue on page 519 #'s 1-15 odd and CHECK YOUR ANSWERS!!!

1)

3)

5)

7)

9)	11)
13)	15)

- That is all for now!

Thursday, April 23

Algebra Unit: Rational and Irrational Numbers

Quiz on 11: 1-2

Lesson: 11-3 Continued: Rational Square Roots

Objective: Be able to find the square roots of numbers that have rational square roots.

- You may want to review the work from Tuesday and Wednesday prior to the quiz 😊.
- Remember, nothing but a pencil and paper (or this sheet) should be out for the quiz.

Quiz on Chapter 11: 1-2

1) $Use\ <, =, or\ >$ to make the statement true. $\frac{8}{3} \qquad \frac{17}{7}$	2) $Use\ <, =, or\ >$ to make the statement true. $-\frac{25}{12} \qquad -2\frac{2}{11}$
3) Arrange the group from least to greatest: $-\frac{39}{8}, -4.7, -\frac{41}{9}$	4) Express the fraction as a decimal. $-\frac{3}{8}$

5) Express the fraction as a decimal. $-3\frac{11}{20}$	6) Express as a fraction in simplest form: 0.78
7) Express as a fraction in simplest form: -2.05	That is the end of the quiz 😊.

- Now that the quiz is over, turn to the next page.

- We are going to continue with 11-3 on page 519.
- I will give you a few examples.
- They look like the fractions that we did yesterday, but they NEED to be REDUCED before you can take the square root.

22)	24)
$-\sqrt{\frac{12}{75}}$ $-\sqrt{\frac{3\cdot 4}{3\cdot 25}}$ $-\sqrt{\frac{4}{25}}$ $-\frac{\sqrt{4}}{\sqrt{25}}$ $-\frac{2}{5}$	$\sqrt{\frac{20}{45}}$ $\sqrt{\frac{5\cdot 4}{5\cdot 9}}$ $\sqrt{\frac{4}{9}}$ $\frac{\sqrt{4}}{\sqrt{9}}$ $\frac{2}{3}$

- Your turn!

21)	23)

- Check those answers!

Friday, April 24

NO SCHOOL!!!