NAME:_____ Math 7.2, Period _____

Mr. Rogove Date:_____

Irrational Numbers Study Guide

Square Roots and Cube Roots

Positive Square Roots

A positive number whose square is equal to a positive number b is denoted by the symbol $\sqrt{b}$. The symbol $\sqrt{b}$ is automatically denotes a positive number. The number $\sqrt{b}$ is called the positive square root of b.

Cube Roots: The cube root of a number, x, is the number, y which satisfy the equation $x = y^3$. The notation we use is as follows: $\sqrt[3]{x} = y$

Example: $8 = 2^3$ and $\sqrt[3]{8} = 2$

Simplifying Square Roots

You can simplify square roots by rewriting the radicand (number inside the radical symbol) as a product containing perfect squares (such as 4, 9, 16, 25, etc). The square root of perfect squares are integers.

Example: $\sqrt{48} = \sqrt{16} \cdot \sqrt{3} = 4\sqrt{3}$

Solving Equations with Square and Cube Roots

We can simplify the expressions until we have the form of $x^2 = p$ *or* $x^3 = p$ and then take the square root or cube root of both sides of the equation to solve for x.

Example: $3x^2 = 48$ →

(divide by 3) $x^2 = 16$ →

(take square root of each side) $x = 4$

For more refreshers, go to www.khanacademy.com. Work on the following exercises and watch associated videos:

- Square roots of perfect squares
- Simplifying square roots
- Cube roots 2
- Cube roots
- Simplifying square roots 2
- Estimating Square Roots

For more information, check out Lessons 67-71 on http://mrrogove.weebly.com

NAME:_____ Math 7.2, Period _____

Mr. Rogove Date:_____

Rational and Irrational Numbers

Rational Numbers: Any number that can be expressed as a fraction $\frac{p}{q}$ where p and q are both integers and $q \neq 0$.
Example: 41.13, $\frac{5}{2}$, $-\frac{111}{135}$, $64.\overline{9}$

Finite Decimals: A subset of rational numbers which have terminating decimals. Written as fractions, **the denominators are products of only 2's and 5's**.
Example: $\frac{3}{32}$, 1.05, 4.253

Repeating Decimals: A subset of rational numbers that have infinite decimals that repeat. Written as fractions, **the denominators are products of numbers other than 2 and 5.**
Example: $\frac{8}{9}$, $\frac{72}{93}$, 0.4545454545 ….

Irrational Numbers: The set of numbers that have infinite decimals that **DO NOT** repeat.
Example: $e, \pi, \sqrt{8}, \sqrt[3]{25}$

For more refreshers, go to www.khanacademy.com. Work on the following exercises and watch associated videos:

- Converting fractions to decimals
- Approximating irrational numbers
- Recognizing rational and irrational exercises
- Comparing rational numbers

For more information, check out Lessons 72-74 on http://mrrogove.weebly.com

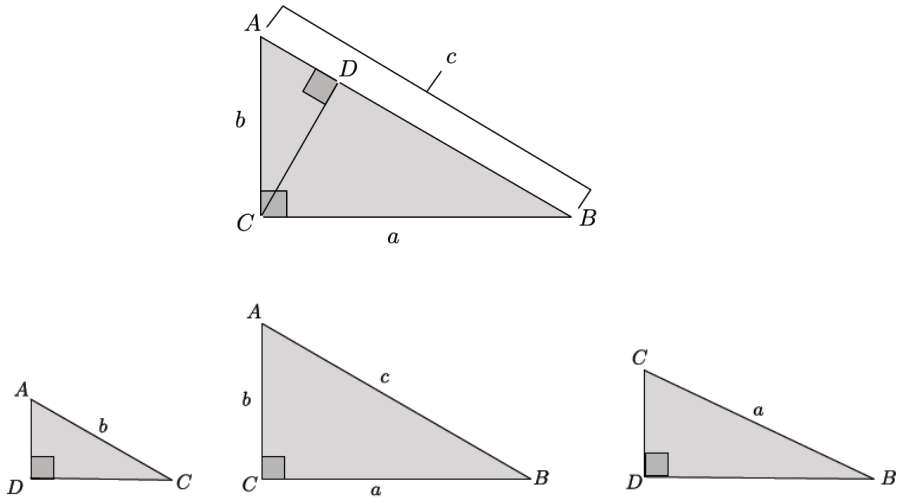
NAME:_____ Math 7.2, Period _____

Mr. Rogove Date:_____

Pythagorean Theorem

Pythagorean theorem is $a^2 + b^2 = c^2$

We can prove this using squares, similar triangles, and area. Refer to lesson 75 for specific information on the proofs.



Distance on a coordinate plane: We can use the Pythagorean Theorem to find the distance of diagonals on a coordinate plane.

Formula: $c = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

For more refreshers, go to www.khanacademy.com. Work on the following exercises and watch associated videos:

- Pythagorean Theorem
- Distance Formula
- Pythagorean Theorem Proofs
- Pythagorean Theorem word problems

For more information, check out Lessons 75-78 on http://mrrogove.weebly.com

NAME:_____ Math 7.2, Period _____

Mr. Rogove Date:_____

PROBLEM SET

I strongly suggest you solve these problems by hand. You will NOT be allowed to use a calculator on the assessment. In order to get ANY credit, you MUST SHOW YOUR WORK!!!

Please initial here to indicate that you read this paragraph. _____

Simplify: $\sqrt{576}$ 24	Simplify: $\sqrt{128}$ $8\sqrt{2}$
Simplify: $3\sqrt{80}$ $12\sqrt{5}$	Simplify: $\sqrt{512}$ $16\sqrt{2}$
Simplify: $\sqrt[3]{729}$ 9	Simplify: $\sqrt[3]{1024}$ $8\sqrt[3]{2}$

NAME:_____ Math 7.2, Period _____

Mr. Rogove Date:_____

Solve for x. $x(2x^2 - 12x) = -6(2x^2 - 9)$ $x = 3$	Solve for x. $3x^2 - 4x + 13 = 2x(x - 2) + 29$ $x = 4$
Solve for x. $\frac{2x^9}{x^6} + 2x^2 = -4x\left(x - \frac{x^2}{2}\right) + 216$ $x = 6$	Solve for x. $\left(3\sqrt{x}\right)^4 = 1$ $x = \frac{1}{9}$
Convert to a decimal. Classify as a repeating or finite decimal. $\frac{7}{12}$ $0.58\overline{3}$ repeating	Convert to a decimal. Classify as a repeating or finite decimal. $\frac{42}{48}$ 0.875 finite

NAME:_____ Math 7.2, Period _____

Mr. Rogove Date:_____

Convert to a decimal. Classify as a repeating or finite decimal. $\frac{13}{15}$ $0.8\overline{6}$ Repeating	Convert to a decimal. Classify as a repeating or finite decimal. $\frac{13}{125}$ 0.104 Finite
Convert to a fraction. $0.\overline{72}$ $\frac{8}{11}$	Convert to a fraction. $0.07\overline{2}$ $\frac{13}{180}$
Convert to a fraction. $0.\overline{234}$ $\frac{26}{111}$	Convert to a fraction. $4.1\overline{2}$ $\frac{371}{90}$ *or* $4\frac{11}{90}$

NAME:_____ Math 7.2, Period _____

Mr. Rogove Date:_____

Approximate to the nearest hundredth $\sqrt{80}$ 8.94	Approximate to the nearest hundredth $\sqrt{90}$ 9.49
Approximate to the nearest hundredth $\sqrt{20}$ 4.47	Approximate to the nearest hundredth $\sqrt{30}$ 5.48
Which is greater: $\sqrt{21}$ *or* 4.4? $\sqrt{21} > 4.4$	Which is greater: $\sqrt{47}$ *or* 6.8 $\sqrt{47} > 6.8$

NAME:_____ Math 7.2, Period _____

Mr. Rogove Date:_____

Label these numbers on a number line in their approximate place.

$$\sqrt[3]{29}\ ,\ \sqrt{9}\ ,\ \frac{10}{3}\ ,\ 3.\bar{2}\ ,\ \sqrt{13}$$

$$\sqrt{9},\quad \sqrt[3]{29},\quad 3.\bar{2},\quad \frac{10}{3},\quad \sqrt{13}$$

all between 3 and 4.

Prove the Pythagorean Theorem for a triangle that has sides of 12, 16, and 20 using the similar triangles proof.

In order to prove the Pythagorean theorem using similar triangles, draw a right triangle with legs of 12 and 16 and a hypotenuse of 20. Then make a line from the right angle perpendicular to the hypotenuse. From this create three triangles that are similar (because of AA similarity). Create proportions based on corresponding sides of similar triangles and use this fact to prove that $a^2 + b^2 = c^2$.

Find the distance between $(1, -2)$ and $(8, -6)$ on the coordinate plane

$\sqrt{65}$

Find the distance between $(6, 10)$ and $(15, -2)$ on the coordinate plane

15