# Algebra 1R

## Eighth Grade

## Mr. Lumanauw

# Table of Contents

# Table of Contents

# Multiplication Table

| X | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
| 2 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 |
| 3 | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 | 30 | 33 | 36 |
| 4 | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 | 40 | 44 | 48 |
| 5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50 | 55 | 60 |
| 6 | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| 7 | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 | 70 | 77 | 84 |
| 8 | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 | 80 | 88 | 96 |
| 9 | 0 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 | 90 | 99 | 108 |
| 10 | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | 110 | 120 |
| 11 | 0 | 11 | 22 | 33 | 44 | 55 | 66 | 77 | 88 | 99 | 110 | 121 | 132 |
| 12 | 0 | 12 | 24 | 36 | 48 | 60 | 72 | 84 | 96 | 108 | 120 | 132 | 144 |

# Priority Standards

8.G.7 - Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

8.G.8 - Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

# Unit 2 - Exponents, Square Roots, Pythagorean Theorem

## Real Life Scenario

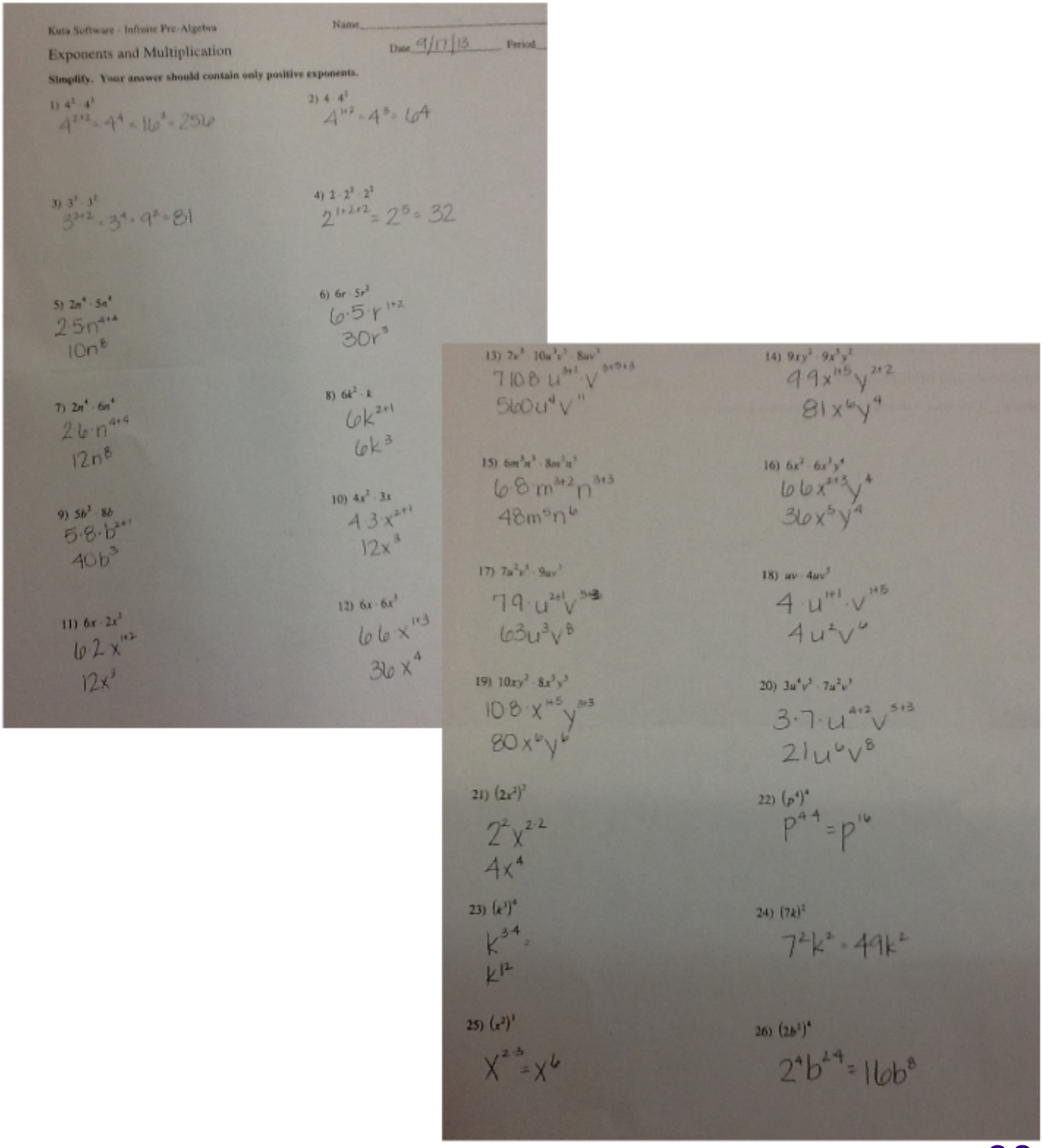
You and two friends have been hired to design a ramp for a Monster Truck company. The company initially want three designs submitted for their review. The provide you with the dimensions of the height and the starting point for the truck and ask you to determine the amount of material they will need to purchase for the incline of the ramp.

## Essential Question

1. How do we approximate irrational numbers?

2. How do we solve for the missing side of a right triangle in a real life situation or on the coordinate grid?

# Exponents and Multiplication Worksheet



Kuta Software - Infinite Pre-Algebra

Name

Exponents and Multiplication

Date 9/17/13 Period

**Simplify. Your answer should contain only positive exponents.**

1) $4^3 \cdot 4^3$
$4^{3+3} = 4^6 = 16^3 = 256$

2) $4 \cdot 4^2$
$4^{1+2} = 4^3 = 64$

3) $3^2 \cdot 3^2$
$3^{2+2} = 3^4 = 9^2 = 81$

4) $2 \cdot 2^2 \cdot 2^2$
$2^{1+2+2} = 2^5 = 32$

5) $2n^4 \cdot 5n^4$
$25n^{4+4}$
$10n^8$

6) $6r \cdot 5r^2$
$6 \cdot 5 \cdot r^{1+2}$
$30r^3$

7) $2n^4 \cdot 6n^4$
$26 \cdot n^{4+4}$
$12n^8$

8) $6k^2 \cdot k$
$6k^{2+1}$
$6k^3$

9) $5b^3 \cdot 8b$
$5 \cdot 8 \cdot b^{3+1}$
$40b^3$

10) $4x^2 \cdot 3x$
$43 \cdot x^{2+1}$
$12x^3$

11) $6x \cdot 2x^2$
$62 \cdot x^{1+2}$
$12x^3$

12) $6x \cdot 6x^3$
$66 \cdot x^{1+3}$
$36x^4$

13) $7v^3 \cdot 10u^3v^3 \cdot 8uv^3$
$7108 \cdot u^{3+1} \cdot v^{3+3+3}$
$560u^4v^{11}$

14) $9xy^2 \cdot 9x^5y^2$
$99x^{1+5}y^{2+2}$
$81x^6y^4$

15) $6m^3n^3 \cdot 8m^3n^3$
$68 \cdot m^{3+3} \cdot n^{3+3}$
$48m^6n^6$

16) $6x^2 \cdot 6x^3y^4$
$66 \cdot x^{2+3}y^4$
$36x^5y^4$

17) $7u^2v^3 \cdot 9uv^3$
$79 \cdot u^{2+1}v^{3+3}$
$63u^3v^8$

18) $uv \cdot 4uv^5$
$4 \cdot u^{1+1} \cdot v^{1+5}$
$4u^2v^6$

19) $10xy^3 \cdot 8x^5y^3$
$108 \cdot x^{1+5}y^{3+3}$
$80x^6y^6$

20) $3u^4v^3 \cdot 7u^2v^3$
$3 \cdot 7 \cdot u^{4+2}v^{3+3}$
$21u^6v^8$

21) $(2x^2)^2$
$2^2 \cdot x^{2 \cdot 2}$
$4x^4$

22) $(p^4)^4$
$p^{4 \cdot 4} = p^{16}$

23) $(k^3)^4$
$k^{3 \cdot 4}$
$k^{12}$

24) $(7k)^2$
$7^2k^2 = 49k^2$

25) $(x^2)^3$
$x^{2 \cdot 3} = x^6$

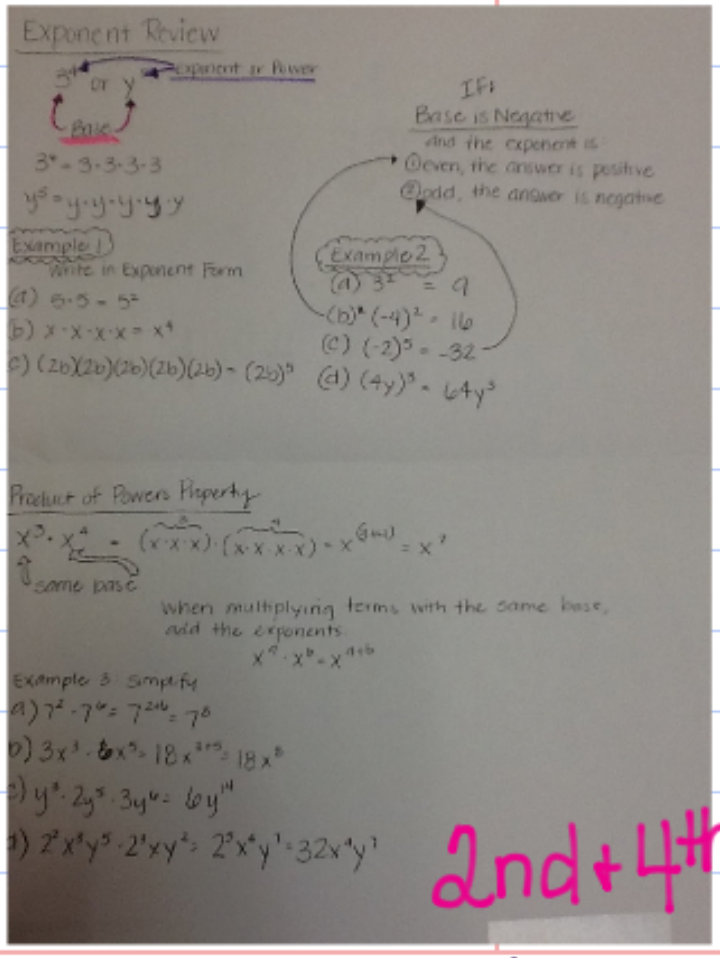
26) $(2b^3)^4$
$2^4b^{3 \cdot 4} = 16b^8$

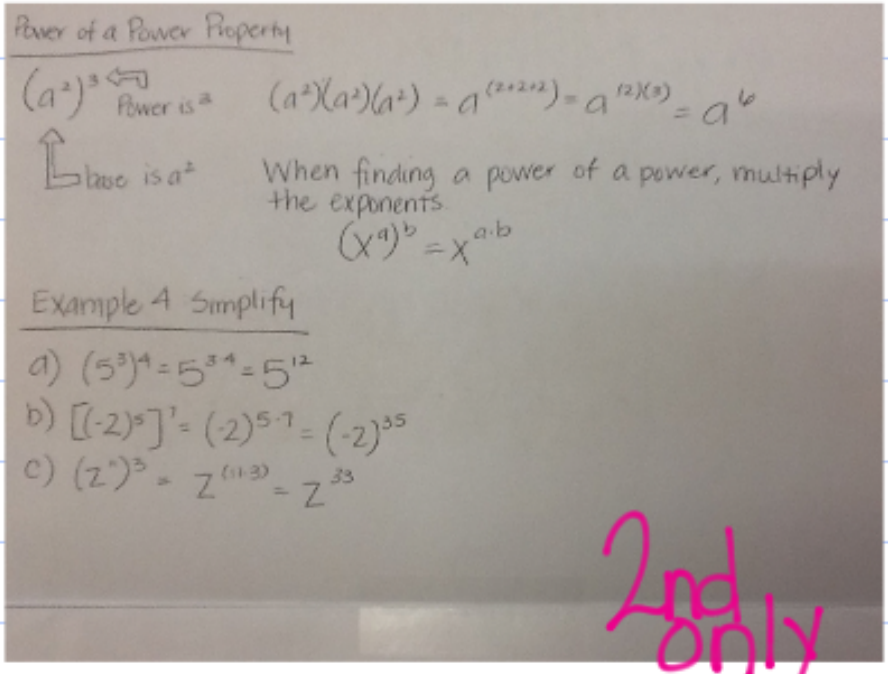
38

# Multiplication Properties of Exponents

Date: 9-16-13

| Cues | Notes |
|---|---|
| Objective | Students will simplify expressions using the multiplication properties of exponents. |
| Algebra Standard | 8.EE.1 |




Summary

The power tells how many times to multiply the base by. When multiplying two terms with the same base, add the exponents. If a power is raised to another power, multiply the exponents.

$x^2 \cdot x^3 = x^{2+3} = x^5$

$(x^2)^3 = x^{2 \cdot 3} = x^6$

39

# Homework

Date: 9-23-13

| Cues | Notes |
| --- | --- |
| Page 197, #16-34 even, 48, 52 | |

Summary

| Topic: | Exponents with Multiplication and Division |
|---|---|
| Objective | To multiply and divide powers. |
| Standard | 8.EE.1 |
| | |
| Exponent of 1 | If the exponent is 1, then you just have the variable or constant itself. |
| Example | $x^1 = x$ |
| | $2^1 = 2$ |
| | $4x = 4^1x^1$ |
| | **We usually don't write the "1"** |
| | |
| Exponent of 0 | If the exponent is 0, then the answer is 1. |
| Example | $y^0 = 1$ |
| | $5^0 = 1$ |
| | $(2x)^0 = 1$ |
| | |
| | |
| Multiplying variables with exponents | So, how do you multiply this: |
| | $(y^2)(y^3)$ |
| | The simplest method is to just ADD THE EXPONENTS! |
| | $y^2y^3 = y^{2+3} = y^5$ |
| | |
| Practice 1 | $(x^3y^5)(x^2yz) =$ |
| | $x^3x^5y^5y^1z^1 = x^{3+2}y^{5+1}z = x^5y^6z$ |
| | |
| Practice 2 | $(2xy)(4y) =$ |
| | $(2)(4)(x)(y)(y) = 8xy^2$ |

This page left blank!!

| Topic: | Exponents with Multiplication and Division |
|---|---|
| Objective | To multiply and divide powers. cont. |
| Standard | 8.EE.1 |
| Practice 3 | $(3x^2y^2)(4x^2) =$ |
| | $(3)(4)(x^2)(x^2)(y^2) = 12x^{2+2}y^2 = 12x^4y^2$ |
| Dividing Variables with Exponents | So, how do you do this? |
| | $\frac{y^3}{y^2} = \frac{(y)(y)(y)}{(y)(y)} = y$ |
| | OR you could have done it like this: |
| | $\frac{y^3}{y^2} = y^{3-2} = y^1 = y$ |

Practice 4 $\frac{x^3yz^2}{xy^2z^2} = x^{3-1}y^{1-2}z^{2-2} = \frac{x^2}{y}$

Practice 5 $\frac{7c^9}{21c^3} = \frac{7}{21}c^{9-3} = \frac{1}{3}c^6 = \frac{c^6}{3}$

# Homework

Date: 9-24-13

| Cues | Notes |
| --- | --- |
| Page 222, #20-38 even, 57 | |

Summary

Cues

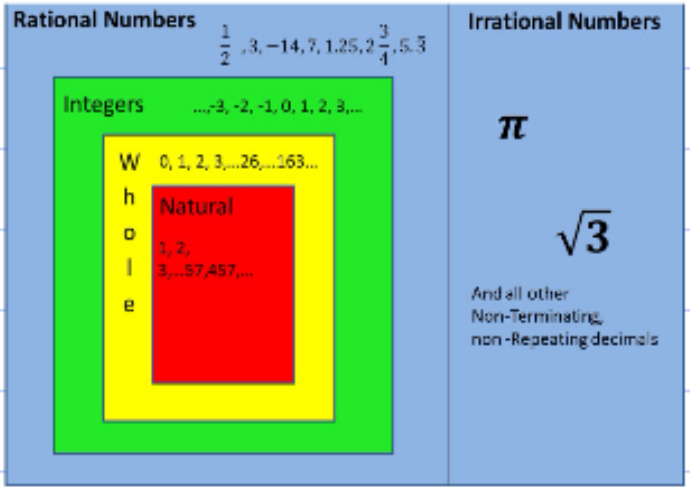
# Objective

To write fractions as decimals and vice versa.

# Standard

8.NS.1

## Real Numbers




# Fractions, Decimals, & Percents

## Changing Percents to Fractions

- Drop the % sign.
- Put the number over 100.
- Reduce.

$8\%$ $120\%$

$$\frac{8}{100} = \boxed{\frac{2}{25}} \qquad \frac{120}{100} \overset{\div 20}{=} \frac{6}{5} = 1\frac{1}{5}$$

Summary

This page left blank!!

# Fractions, Decimals, and Percents, cont.

Date: 9-24-13

Cues

Notes

## Changing Fractions to Decimals

- Perform Long Division, Bottom out – Top in.

$\frac{19}{6} \rightarrow$

$$
\begin{array}{r}
3.1\overline{6} \\
6\overline{)\,19.00} \\
\underline{18} \\
10 \\
\underline{6} \\
40 \\
\underline{36} \\
4
\end{array}
$$

## Changing Decimals to Fractions

Here's another one:

$.5 = \frac{5}{10}$ ← Hey, this guy simplifies!

↑ tenths $(\frac{1}{10})$

$.5 = \frac{5}{10} \div \frac{5}{5} = \frac{1}{2}$

So, $.5 = \frac{1}{2}$

One more:

$.325$

↑ Last spot → $\frac{1}{1000}$

$.325 = \frac{325}{1000} \div \frac{25}{25} = \frac{13}{40}$

↑ Reduce it!

Summary

# Warm Up - Square Roots

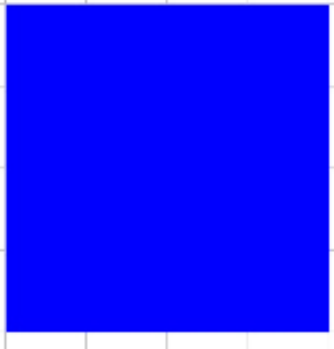
9-25-13

Draw a square with an area of 9 units squared.

$3 \cdot 3 = 9$

$\sqrt{9} = 3$ ← The length of a side

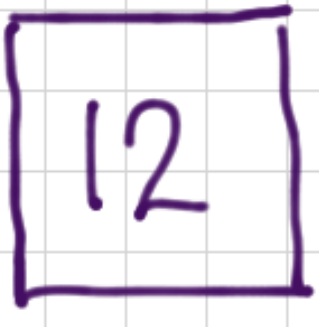
Draw a square with an area of 16 units squared.



$4 \cdot 4 = 16$

$\sqrt{16} = 4$

Draw a square with an area of 12 square units.


$\approx 3.4$

# Irrational Numbers

Date: 9-25-13

Cues

Notes

Objective

To compare and order real numbers.

Standards

Identifying Rational and Irrational Numbers

a) $\sqrt{2}$ → irrational because 2 is a positive integer but not a perfect square.

b) $-\frac{1}{9}$ → rational because it is a quotient of 2 integers.

c) $-\sqrt{169}$ → rational because $-\sqrt{169} = -13$.

d) 1.2112112... → irrational because it is not terminating and not repeating.

Summary

# Approximating Square Roots Worksheet

Date: 9-25-13

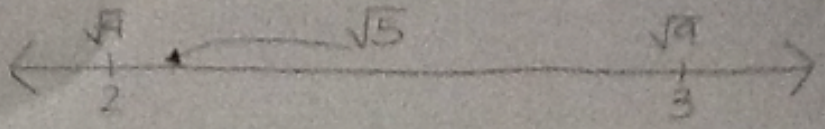
Cues

Math Notes: π

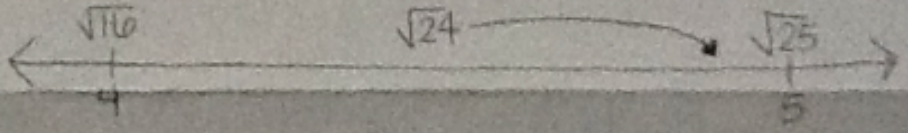
**Estimating Square Roots**

**Use a number line**

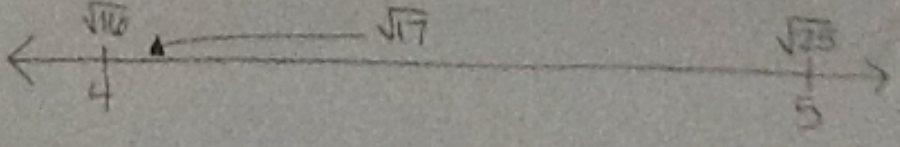
1. $\sqrt{5} \approx 2.1$




2. $\sqrt{24} \approx 4.9$

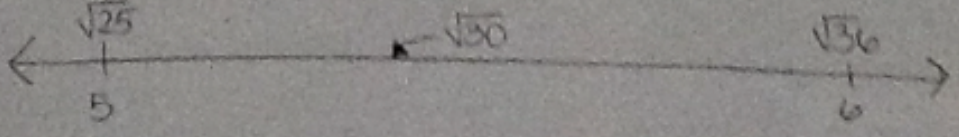



3. $\sqrt{17} \approx 4.1$

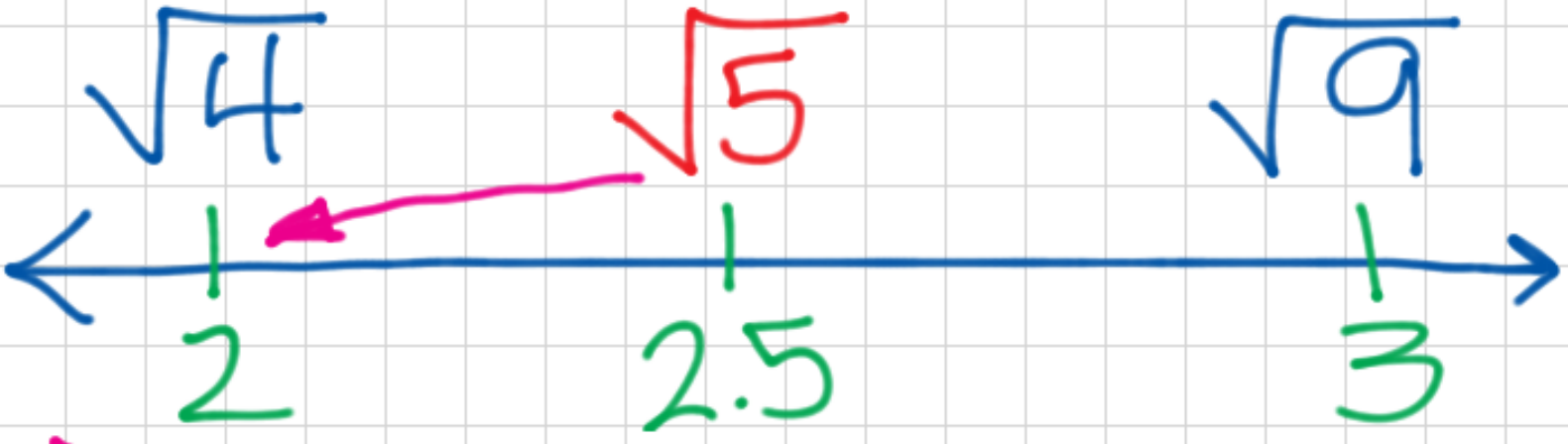



Summary

4. $\sqrt{30} \approx 5.4$

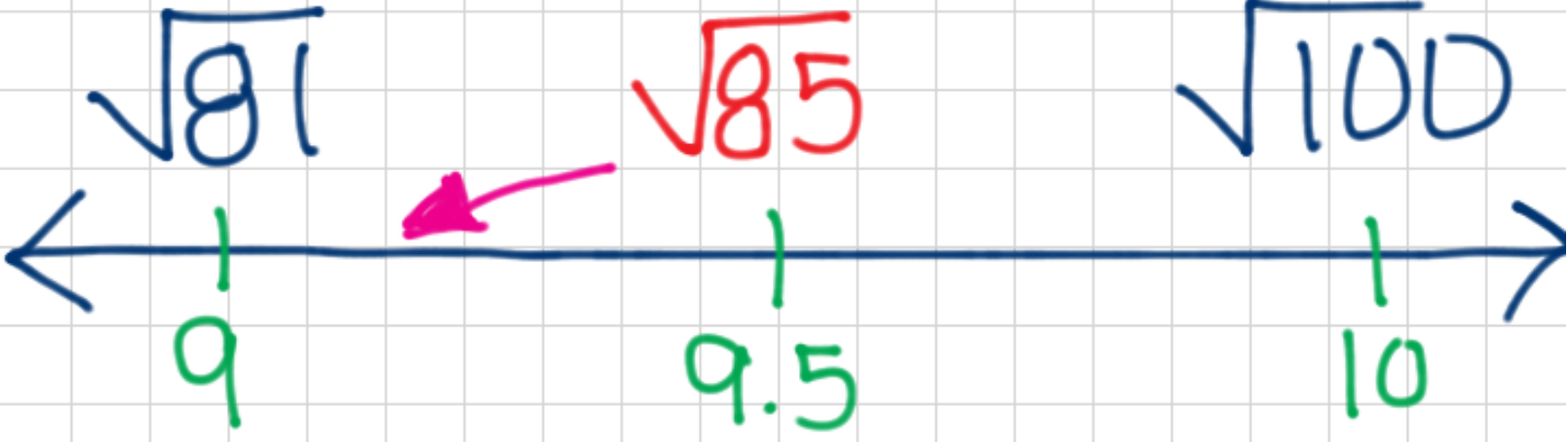


# Irrational Numbers, cont.




$\sqrt{5}$ is between 2 and 3.

$\sqrt{5} \approx 2.1$




$\sqrt{85}$ is between 9 and 10.

$\sqrt{85} \approx 9.3$

# Homework

9-26-13

Cues

Notes

Page 456

#42, 44, 45-50 all, 54-57 all

Summary

# Square Roots

Date: 9-26-13

Cues

Notes

## Objective

To find and approximate square roots of numbers.

## Standard

8.EE.1

**Radical Expression**

An expression that involves a square root sign. $\sqrt{2x^2+5}$

**Square Roots**

Reals

| Rationals | Irrationals |
|---|---|
| $\sqrt{0}=0$ | $\sqrt{2}\approx 1.414$ |
| $\sqrt{1}=1$ | $\sqrt{3}\approx 1.732$ |
| $\sqrt{4}=2$ | $\sqrt{5}\approx 2.236$ |
| $\sqrt{9}=3$ | $\sqrt{6}\approx 2.449$ |
| $\sqrt{16}=4$ | $\sqrt{7}\approx 2.646$ |
| $\sqrt{25}=5$ | $\sqrt{8}\approx 2.828$ |

**EXAMPLE** **#1 Evaluate the Radical Expression**

Evaluate the Expression

a) $\sqrt{0} = 0$

b) $-\sqrt{49} = -7$

c) $\pm\sqrt{81} = \pm 9$

d) $\sqrt{256} = 16$

e) $\pm\sqrt{169} = \pm 13$

f) $2+\sqrt{9} = 2+3$
$= 5$

g) $3\pm\sqrt{25} = 3\pm 5$

$3+5 = 8$

$3-5 = -2$

Summary

This page left blank!!

# Square Roots, cont.

Date: 9-26-13

**EXAMPLE** **#2 Evaluate the Radical Expressions**

- *Evaluate the expression when a = 12 and b = 4*

| $\sqrt{a+b}$ | $\sqrt{b^2 - a}$ | $3\sqrt{ab+1}$ |
|---|---|---|
| $\sqrt{12+4}$ | $\sqrt{4^2 - 12}$ | $3\sqrt{(12)(4)+1}$ |
| $\sqrt{16}$ | $\sqrt{16 - 12}$ | $3\sqrt{48+1}$ |
| | $\sqrt{4}$ | $3\sqrt{49}$ |
| 4 | | $3 \cdot 7$ |
| | 2 | 21 |

**EXAMPLE** **#3 Solve Quadratic Equations**

Solve each equation

a) $x^2 = 16$

$\sqrt{x^2} = \sqrt{16}$

$|x| = 4$

$x = \pm 4$

b) $p^2 = 225$

$\sqrt{p^2} = \sqrt{225}$

$|p| = 15$

$p = \pm 15$

c) $k^2 = 15$

$\sqrt{k^2} = \sqrt{15}$

$|k| = \sqrt{15}$

$k = \pm\sqrt{15}$

d) $x^2 = -4$

No real solution

e) $x^2 = 0$

$x = 0$