Chapter 10A Student Success Sheet (SSS)

Radical Expressions and Geometry

1

Olathe East High School – Intermediate Algebra

Name:_____

Hour: ____

Need Help? Support is available!

- www.mhollan.weebly.com
- www.srushingoe.weebly.com

"There are no secrets to success. It is the result of preparation, hard work, and learning from failure."

Colin Powell

Concept #	What we will be learning…	# of videos
1	Simplifying radicals with numbers and variables using factor trees	
2	Simplifying radicals when multiply/divide first	
3	Pythagorean Theorem	
4	Rationalizing denominators	
5	Adding and subtracting radicals (same only)	
6	Using distribution and FOILing with radicals	

CONCEPT 1 – Factor Trees with Numbers and Variables

A perfect square is

$1^2 =$	$2^2 =$	$3^2 =$	$4^2 =$	$5^2 =$	$6^2 =$	$7^2 =$	$8^2 =$
$9^2 =$	$10^2 =$	$11^2 =$	$12^2 =$	$13^2 =$	$14^2 =$	$15^2 =$	$16^2 =$

$1\ squared = 1^2 = 1 \cdot 1 =$ ____; $\sqrt{1} =$ ____

$2\ squared = 2^2 = 2 \cdot 2 =$ ____; $\sqrt{4} =$ ____

$3\ squared = 3^2 = 3 \cdot 3 =$ ____; $\sqrt{9} =$ ____

$4\ squared = 4^2 = 4 \cdot 4 =$ ____; $\sqrt{16} =$ ____

$5\ squared = 5^2 = 5 \cdot 5 =$ ____; $\sqrt{25} =$ ____

$6\ squared = 6^2 = 6 \cdot 6 =$ ____; $\sqrt{36} =$ ____

$7\ squared = 7^2 = 7 \cdot 7 =$ ____; $\sqrt{49} =$ ____

$8\ squared = 8^2 = 8 \cdot 8 =$ ____; $\sqrt{64} =$ ____

$9\ squared = 9^2 = 9 \cdot 9 =$ ____; $\sqrt{81} =$ ____

$10\ squared = 10^2 = 10 \cdot 10 =$ ____; $\sqrt{100} =$ ____

$11\ squared = 11^2 = 11 \cdot 11 =$ ____; $\sqrt{121} =$ ____

$12\ squared = 12^2 = 12 \cdot 12 =$ ____; $\sqrt{144} =$ ____

$13\ squared = 1^{32} = 13 \cdot 13 =$ ____; $\sqrt{169} =$ ____

$14\ squared = 14^2 = 14 \cdot 14 =$ ____; $\sqrt{196} =$ ____

$15\ squared = 15^2 = 15 \cdot 15 =$ ____; $\sqrt{225} =$ ____

PARTS OF A RADICAL

An expression that contains a square root symbol is a _____. It has two parts.

Coefficient: _____ → $a\sqrt{c}$ ← **Radicand**: _____

_____ _____

SQUARE ROOTS

Taking the square root of a number is _____.

The symbol $\sqrt{\ }$ tells you to _____.

If your radicand has more than one factor (numbers and variables), _____.

Who can "go out of the house"? _____

Who has to "stay home"? _____

Simplify the following radical expressions.

1) $\sqrt{100}$ 2) $\sqrt{25}$ 3) $\sqrt{36}$ 4) $\sqrt{121}$

5) $\sqrt{150}$ 6) $\sqrt{28}$ 7) $\sqrt{96}$ 8) $\sqrt{294}$

9) $\sqrt{75x^2}$ 10) $\sqrt{64m^3}$ 11) $\sqrt{174r^3}$ 12) $\sqrt{63n^4}$

13) $\sqrt{72xy^5}$ 14) $\sqrt{320u^4v^3}$ 15) $\sqrt{25m^3p^4q^4}$ 16) $\sqrt{80p^4qr}$

CONCEPT 2 – Simplifying Radicals When Multiply/Divide First

Coefficient:

Radicand:

You can multiply/divide _____ with _____.

You can multiply/divide _____ with _____.

Then, _____ with a _____ _____!

PART 1:

17) $\sqrt{2} \cdot \sqrt{20}$

18) $\sqrt{3} \cdot \sqrt{15}$

19) $\sqrt{15k^3} \cdot \sqrt{3k^3}$

20) $\sqrt{3x} \cdot \sqrt{20x^3}$

21) $\sqrt{15p} \cdot \sqrt{15p^5}$

22) $-5\sqrt{10} \cdot -\sqrt{6}$

23) $3\sqrt{6} \cdot -3\sqrt{10}$

PART 2:

24) $-\sqrt{15b^2} \cdot 2\sqrt{20b}$

25) $-5\sqrt{10v^3} \cdot 3\sqrt{20v}$

26) $\frac{\sqrt{6}}{\sqrt{16}}$

27) $\frac{\sqrt{2}}{\sqrt{25}}$

28) $\frac{\sqrt{4}}{\sqrt{16}}$

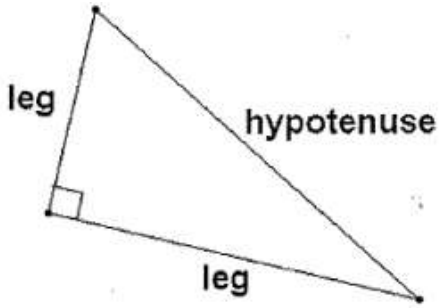
29) $\frac{2\sqrt{16}}{3\sqrt{25}}$

30) $\frac{4\sqrt{15}}{5\sqrt{4}}$

CONCEPT 3 – Pythagorean Theorem

INTRO

Given a right triangle with leg "a", leg "b", and $hypotenuse$ "c".



a RIGHT TRIANGLE

$$a^2 + b^2 = c^2$$

Pythagorean Theorem goes with Right Triangles
Hypotenuse is across from the Right Angle
Legs are "a" and "b"
Hypotenuse "c"
Plug the numbers in and see how easy it can be!

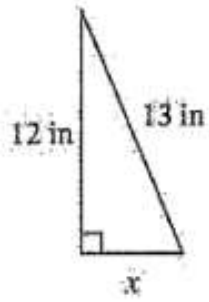
Singing "a squared plus b squared equals c squared!

Pythagorean Theorem is a wonderful equation
Just gotta make sure you plug in the right location
Draw the triangle
Label the sides
Then you'll solve these problems and get them all right.

PART 1

Find the missing side of each right triangle. Side c is the hypotenuse. Sides a and b are legs. Leave your answers in simplest radical form.

31)



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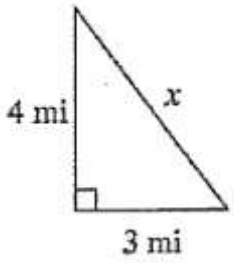

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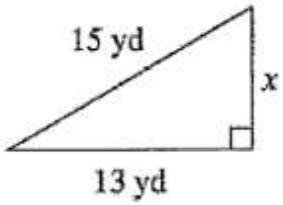


PART 2

Find the missing side of each right triangle. Side c is the hypotenuse. Sides a and b are legs. Leave your answers in simplest radical form.

34) $a = 11\ m,\ c = 15\ m$

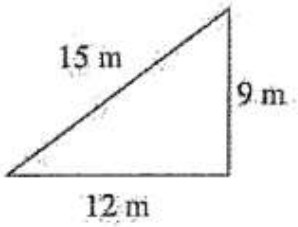
35) $b = \sqrt{6}\ yd,\ c = 4\ yc$

State if the triangle is a RIGHT triangle or not.

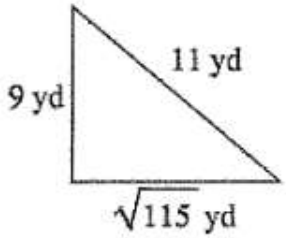
(Does the Pythagorean Theorem work? If so, it is a right triangle! If the Pythagorean Theorem does not work, it is not a right triangle!)

(Remember that the longest side must represent the hypotenuse!)

36)



37)



38) $10\ cm,\ 5\ cm,\ 50.5\ cm$

CONCEPT 4 – Rationalizing Denominators

There can never (_____!) be a _____ in the _____. EVER!

So, we do something called _____ the _____.

Basically, this means we _____ top and bottom by the _____

from the _____. Then we simplify!

39) $\frac{\sqrt{3}}{\sqrt{5}}$

40) $\frac{3}{\sqrt{2}}$

41) $\frac{\sqrt{4}}{\sqrt{5}}$

42) $-\frac{4}{\sqrt{2}}$

43) $\frac{\sqrt{2}}{\sqrt{5}}$

44) $\frac{\sqrt{16}}{\sqrt{12}}$

45) $\frac{\sqrt{20}}{\sqrt{15}}$

CONCEPT 5 – Adding and Subtracting Radicals (same and different radicands)

$3\square + 4\square = \_\_\square$ $\quad$ $\text{₩} + \text{₩} = \_\_\_\_$ $\quad$ $\square + 2\square = \_\_\square$

$2\text{₩} - 3\text{₩} + 4\text{₩} = \_\_\_\_$ $\quad$ $7\text{⌂} - 3\text{⌂} = \_\_\_\_$ $\quad$ $\square + 2\text{⌂} = \_\_\_\_\_$

$8\text{₩} - 4\text{₩} + 3\text{⌂} - \text{⌂} + 2\text{⌂} = \_\_\_\_\_$

46) $2\sqrt{5} + 2\sqrt{5}$ $\quad$ 47) $-2\sqrt{2} + 2\sqrt{2}$ $\quad$ 48) $-2\sqrt{2} + 3\sqrt{2} + 3\sqrt{2}$

49) $2\sqrt{2} + 3\sqrt{2} - \sqrt{5}$ $\quad$ 50) $3\sqrt{6} + 2\sqrt{3} + 2\sqrt{3} - \sqrt{3}$ $\quad$ 51) $3\sqrt{6} + 3\sqrt{6} - 2\sqrt{2} - 3\sqrt{5}$

CONCEPT 6 – Using Distributive Property and FOILing with radicals

PART 1

monomial x binomial:

52) $\sqrt{3}(\sqrt{2} + \sqrt{3})$

53) $\sqrt{10}(\sqrt{2} + 2)$

54) $\sqrt{6}(\sqrt{2} + \sqrt{6})$

55) $-2\sqrt{10}(2\sqrt{2} + 2)$ (What if there are coefficients?)

PART 2

binomial x binomial:

56) $\left(\sqrt{6}+\sqrt{2}\right)^2$

57) $(\sqrt{3}+1)(\sqrt{3}-1)$

58) $(\sqrt{2}+\sqrt{3})(\sqrt{2}+\sqrt{5})$

59) $(\sqrt{3}-1)(\sqrt{3}+5)$

60) $(-5\sqrt{3}+4\sqrt{5})(-2\sqrt{3}+3\sqrt{5})$