Algebra I
10-1: The Pythagorean Theorem

Name ______________________________
Date _____________ Class Period _______

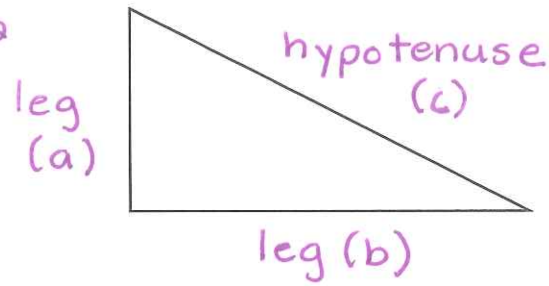
Learning Target: Today you will be able to USE THE PYTHAGOREAN THEOREM TO SOLVE FOR MISSING SIDES OF A RIGHT TRIANGLE AND IDENTIFY TYPES OF TRIANGLE

Question/Main Ideas:	Notes:

The Pythagorean Theorem

$(\text{leg})^2 + (\text{leg})^2 = (\text{hyp})^2$

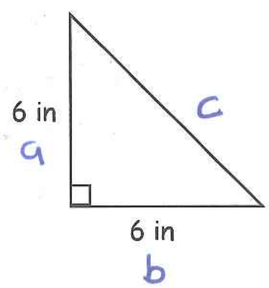
$a^2 + b^2 = c^2$



Example 1: Using the Pythagorean Theorem

Find the length of the missing side.

a.



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

$(6)^2 + (6)^2 = c^2$

$36 + 36 = c^2$

$\sqrt{72} = \sqrt{c^2}$

$\boxed{c \approx 8.5\text{in}}$

b. What is the length of the missing leg of a right triangle with hypotenuse of 12 cm and other side length of 5 cm?

$a = ?\quad b = 5\quad c = 12$

$a^2 + 5^2 = 12^2$

$a^2 + 25 = 144$

$ -25 \quad -25$

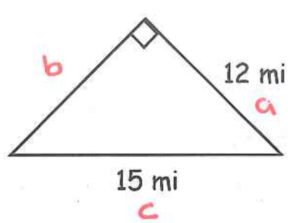
$\sqrt{a^2} = \sqrt{119}$

$\boxed{a \approx 10.9\text{cm}}$

Now It's Your Turn

Find the length of the missing side.

a.



$12^2 + b^2 = 15^2$

$144 + b^2 = 225$

$b^2 = 81$

$\boxed{b = 9\text{mi}}$

b. What is the length of the hypotenuse of a right triangle with legs of lengths 9 ft and 12 ft?

$a = 9\quad b = 12\quad c = ?$

$9^2 + 12^2 = c^2$

$81 + 144 = c^2$

$225 = c^2$

$\boxed{15 = c}$

Table Exploration: Use the given triangles to complete the table

a	b	c	$a^2 + b^2$	<, >, =	c^2	Type of Triangle
3	4	5	25	=	25	Right
2	7	8	53	<	64	Obtuse
5	9	10	106	>	100	Acute
8	10	11	164	>	121	Acute
3	8	9	73	<	81	Obtuse

Converse of the Pythagorean Theorem

Acute Triangle: $a^2 + b^2 > c^2$

Obtuse Triangle: $a^2 + b^2 < c^2$

Right Triangle: $a^2 + b^2 = c^2$

Example 2: Identifying Triangles

Identify whether the given side lengths represent an acute, an obtuse, or a right triangle.

a. 6in, 24 in, 25 in Obtuse

a b c

$6^2 + 24^2 = 25^2$

$36 + 576 = 625$

$612 < 625$

b. 8 ft, 15 ft, 16 ft Acute

a b c

$8^2 + 15^2 = 16^2$

$64 + 225 = 256$

$289 > 256$

Now It's Your Turn

Identify whether the given side lengths represent an acute, an obtuse, or a right triangle.

a. 10 cm, 24 cm, 26 cm Right

a b c

$10^2 + 24^2 = 26^2$

$100 + 576 = 676$

$676 = 676$

b. 4 yd, 8 yd, 10 yd Obtuse

a b c

$4^2 + 8^2 = 10^2$

$16 + 64 = 100$

$80 < 100$

c. If a, b, and c satisfy the equation $a^2 + b^2 = c^2$, are 2a, 2b, and 2c also possible sides lengths of a right triangle? How do you know?

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

$4a^2 + 4b^2 = 4c^2$

$4(a^2 + b^2 = c^2)$

Yes, multiplication property of equality

Summary: ______________________________

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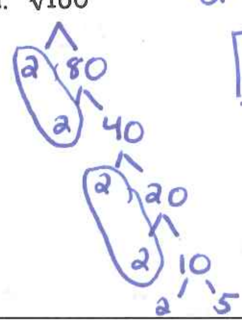
Algebra I
10-2 Day 1: Simplifying Radicals

Name ____________________
Date ____________ Class Period ______

Learning Target: Today you will be able to SIMPLIFY RADICALS INVOLVING PRODUCTS OF NUMBERS AND VARIABLES

Question/Main Ideas:	Notes:
Example 1: Multiplying Radicals	Multiply the radicals and then simplify. a. $\sqrt{12} \bullet \sqrt{3} = \sqrt{12 \cdot 3}$ $= \sqrt{36}$ $= \boxed{6}$ b. $5\sqrt{2} \bullet 4\sqrt{32}$ $(5 \cdot 4)\sqrt{2 \cdot 32}$ $20\sqrt{64}$ $20(8)$ $\boxed{160}$
Steps to Simplifying Square Roots	Factor tree the number under the radical For each factor pair, pull one number out in front of the radical Leave all non-paired factors under the radical Multiply any numbers outside together and/or any numbers inside together.
Example 2: Removing Perfect Square Factors	Simplify the following. a. $\sqrt{160}$  $2 \cdot 2\sqrt{2 \cdot 5}$ $\boxed{4\sqrt{10}}$ b. $\sqrt{63}$  $\boxed{3\sqrt{7}}$
Now It's Your Turn	Simplify the following. a. $\sqrt{72}$  $2 \cdot 3\sqrt{2}$ $\boxed{6\sqrt{2}}$ b. $\sqrt{12}$  $\boxed{2\sqrt{3}}$

Simplifying Square Roots with Variables

Same as number factors. Pull out one variable for every pair.

Example 3: Removing Variable Factors

Simplify the following.

a. $\sqrt{54n^7} = \sqrt{54nnnnnnn}$

2 27

3 9

3 3

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

$\boxed{3n^3\sqrt{6n}}$

b. $2\sqrt{7t} \bullet 3\sqrt{14t^2}$

$6\sqrt{98t^3} \rightarrow t\,(t \cdot t)$

2 49

7 7

$6 \cdot 7 \cdot t\sqrt{2t}$

$\boxed{42t\sqrt{2t}}$

Now It's Your Turn

Simplify the following.

a. $-m\sqrt{80m^9}$ → mmmmmmmmm

2 40

2 20

2 10

2 5

$-2 \cdot 2 \cdot m \cdot m^4\sqrt{5m}$

$\boxed{-4m^5\sqrt{5m}}$

b. $3\sqrt{6} \bullet \sqrt{18}$

$3\sqrt{108}$

$3 \cdot 2 \cdot 3\sqrt{3} = \boxed{18\sqrt{3}}$

108

2 54

2 27

3 9

3 3

c. $\sqrt{2a} \bullet \sqrt{9a^3}$

$\sqrt{18a^4}$

2 9

3 3

$\boxed{3a^2\sqrt{2}}$

d. $7\sqrt{5x} \bullet 3\sqrt{20x^5}$

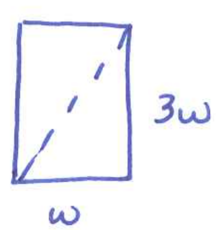
$21\sqrt{100x^6}$

$21 \cdot 10x^3$

$\boxed{210x^3}$

Example 4: Writing a Radical Expression

A rectangular door in a museum is three times as tall as it is wide. What is the simplified expression for the maximum length of a painting that fits through the door?



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

$w^2 + (3w)^2 = c^2$

$w^2 + 9w^2 = c^2$

$\sqrt{10w^2} = \sqrt{c^2}$

$\boxed{w\sqrt{10}} = c$

Summary: ______________________________

Algebra I
10-2 Day 2: Simplifying Radicals

Name ______________________________
Date ______________ Class Period _______

Learning Target: Today you will be able to SIMPLIFY RADICALS INVOLVING QUOTIENTS INCLUDING RATIONALIZING THE DENOMINATOR

Question/Main Ideas:	Notes:
Example 1: Simplifying Fractions within Radicals	Simplify the following. a. $\sqrt{\frac{64}{49}} = \frac{\sqrt{64}}{\sqrt{49}} = \frac{8}{7}$ b. $\sqrt{\frac{8x^3}{50x}} = \sqrt{\frac{4x^2}{25}} = \frac{2x}{5}$
Now It's Your Turn	Simplify the following. a. $\sqrt{\frac{144}{9}} = \sqrt{16} = 4$ b. $\sqrt{\frac{36a}{4a^3}} = \sqrt{\frac{9}{a^2}} = \frac{3}{a}$ c. $\sqrt{\frac{25y^3}{z^2}} = \frac{5y\sqrt{y}}{z}$
Definition: Rationalize the Denominator	Radicals should not be left in the denominator. So, multiply the numerator and the denominator by the original denominator
Example 2: Rationalizing Denominators	Simplify the following. a. $\frac{\sqrt{3}}{\sqrt{7}} \cdot \frac{\sqrt{7}}{\sqrt{7}} = \frac{\sqrt{21}}{7}$ b. $\frac{\sqrt{7}}{\sqrt{8n}} \cdot \frac{\sqrt{8n}}{\sqrt{8n}} = \frac{\sqrt{56n}}{8n} = \frac{2\sqrt{14n}}{8n} = \frac{\sqrt{14n}}{4n}$
Now It's Your Turn	Simplify the following. a. $\frac{\sqrt{2}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{\sqrt{6}}{\sqrt{9}} = \frac{\sqrt{6}}{3}$ b. $\frac{\sqrt{5}}{\sqrt{18m}} \cdot \frac{\sqrt{18m}}{\sqrt{18m}} = \frac{\sqrt{90m}}{18m} = \frac{3\sqrt{10m}}{18m} = \frac{\sqrt{10m}}{6m}$

Summary: ____

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Algebra I
10-3 Day 1: Operations with Radical Expressions

Name ______________________________
Date _____________ Class Period _______

Learning Target: Today you will be able to SIMPLIFY SUMS, DIFFERENCES, AND PRODUCTS OF RADICAL EXPRESSIONS

Question/Main Ideas:	Notes:
Definition: Like Radicals	When simplified, the expressions under the radicals match
Definition: Unlike Radicals	When simplified, the expressions under the radicals do not match
Example 1: Combining Like Radicals	Simplify the following. a. $6\sqrt{11}+9\sqrt{11} = 15\sqrt{11}$ Add coefficients b. $1\sqrt{3}-5\sqrt{3} = -4\sqrt{3}$ $1-5=-4$
Now It's Your Turn	Simplify the following. a. $7\sqrt{2}-8\sqrt{2} = -1\sqrt{2}$ $= -\sqrt{2}$ b. $5\sqrt{5}+2\sqrt{5} = 7\sqrt{5}$
Example 2: Simplifying to Combine Like Terms	Simplify the following. a. $5\sqrt{3}-\sqrt{12} = 5\sqrt{3} - 2\sqrt{3}$ $= 3\sqrt{3}$ $\sqrt{12}$ 2 6 2 3
Now It's Your Turn	Simplify the following. a. $4\sqrt{7}+2\sqrt{28}$ 28 2 14 2 7 $4\sqrt{7}+2\cdot 2\sqrt{7}$ $4\sqrt{7}+4\sqrt{7}$ $8\sqrt{7}$ b. $5\sqrt{32}-4\sqrt{18}$ 2 16 2 9 2 8 3 3 2 4 2 2 $20\sqrt{2} - 12\sqrt{2}$ $8\sqrt{2}$

Example 3: Multiplying Radical Expressions	Simplify the following.

a. $\sqrt{10}(\sqrt{6}+3)$

$\sqrt{10}\cdot\sqrt{6}+\sqrt{10}\cdot 3$

$\sqrt{60}+3\sqrt{10}$

$2\sqrt{15}+3\sqrt{10}$

b. $(\sqrt{6}-2\sqrt{3})(\sqrt{6}+\sqrt{3})$

$\sqrt{6}\cdot\sqrt{6}+\sqrt{6}\cdot\sqrt{3}+-2\sqrt{3}\cdot\sqrt{6}+-2\sqrt{3}\cdot\sqrt{3}$

$\sqrt{36}+\sqrt{18}-2\sqrt{18}-2\sqrt{9}$

$6+3\sqrt{2}-6\sqrt{2}-2\cdot 3$

$6-3\sqrt{2}-6$

$-3\sqrt{2}$

Now It's Your Turn

Simplify the following.

a. $\sqrt{2}(\sqrt{6}+5)$

$\sqrt{2}\cdot\sqrt{6}+\sqrt{2}\cdot 5$

$\sqrt{12}+5\sqrt{2}$

$2\sqrt{3}+5\sqrt{2}$

b. $(\sqrt{11}-2)^2$

$(\sqrt{11}-2)(\sqrt{11}-2)$

$\sqrt{11}\cdot\sqrt{11}+\sqrt{11}\cdot -2+\sqrt{11}\cdot -2+-2\cdot -2$

$11-2\sqrt{11}-2\sqrt{11}+4$

$15-4\sqrt{11}$

c. $(\sqrt{6}-2\sqrt{3})(4\sqrt{3}+3\sqrt{6})$

$\sqrt{6}\cdot 4\sqrt{3}+\sqrt{6}\cdot 3\sqrt{6}+-2\sqrt{3}\cdot 4\sqrt{3}+-2\sqrt{3}\cdot 3\sqrt{6}$

$4\sqrt{18}+3\sqrt{36}-8\sqrt{9}-6\sqrt{18}$

$12\sqrt{2}+3\cdot 6-8\cdot 3-18\sqrt{2}$

$12\sqrt{2}+18-24-18\sqrt{2}$

$-6-6\sqrt{2}$

Summary: ______________________________

Algebra I
10-3 Day 2: Operations with Radical Expressions

Name ______________________________
Date ______________ Class Period _______

Learning Target: Today you will be able to QUOTIENTS OF RADICAL EXPRESSIONS

Question/Main Ideas:	Notes:
Concept: Multiplying Conjugates	Simplify $(4-\sqrt{8})(4+\sqrt{8})$ $4\cdot 4+4\sqrt{8}-\sqrt{8}\cdot 4+-\sqrt{8}\cdot\sqrt{8}$ $16+4\sqrt{8}-4\sqrt{8}+-\sqrt{64}$ $16-8$ 8 b. What do you notice about the original problem? How does that impact the answer? Same terms - one is (-) one is (+). No radicals left.
Definition: Conjugates	The sum and difference of the same two terms. (i.e. $\sqrt{7}+\sqrt{3}$ and $\sqrt{7}-\sqrt{3}$)
Example 1: Rationalizing a Denominator using Conjugates	Simplify the following. a. $\frac{10}{\sqrt{7}-\sqrt{2}}\cdot\frac{\sqrt{7}+\sqrt{2}}{\sqrt{7}+\sqrt{2}}$ $\frac{10(\sqrt{7}+\sqrt{2})}{(\sqrt{7})^2-(\sqrt{2})^2}=\frac{10(\sqrt{7}+\sqrt{2})}{5}$ $=2(\sqrt{7}+\sqrt{2})=2\sqrt{7}+2\sqrt{2}$ Now It's Your Turn: Simplify b. $\frac{-3}{\sqrt{10}+\sqrt{5}}\cdot\frac{\sqrt{10}-\sqrt{5}}{\sqrt{10}-\sqrt{5}}=\frac{3(\sqrt{10}-\sqrt{5})}{(\sqrt{10})^2-(\sqrt{5})^2}$ $=\frac{3(\sqrt{10}-\sqrt{5})}{5}=\frac{3\sqrt{10}-3\sqrt{5}}{5}$
Example 2: Solving a Proportion Involving Radicals	Solve the following for w. $\frac{1+\sqrt{5}}{2}=\frac{4}{w}$ $=\frac{(1+\sqrt{5})w}{1+\sqrt{5}}=\frac{8}{1+\sqrt{5}}\cdot\frac{1-\sqrt{5}}{1-\sqrt{5}}=\frac{8(1-\sqrt{5})}{1^2-(\sqrt{5})^2}$ $=\frac{8(1-\sqrt{5})}{-4}=-2(1-\sqrt{5})=\boxed{-2+2\sqrt{5}}$
Now It's Your Turn	Simplify the following for x. $\frac{2-\sqrt{3}}{7}=\frac{5}{x}$ $=\frac{(2-\sqrt{3})x}{2+\sqrt{3}}=\frac{35}{2+\sqrt{3}}\cdot\frac{2-\sqrt{3}}{2-\sqrt{3}}=\frac{35(2-\sqrt{3})}{2^2-(\sqrt{3})^2}$ $=\frac{35(2-\sqrt{3})}{1}=\boxed{70-35\sqrt{3}}$

Summary: ____

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Algebra I
10-4: Solving Radical Equations

Name ______________________________
Date _____________ Class Period _______

Learning Target: Today you will be able to SOLVE EQUATIONS CONTAINING RADICALS

Question/Main Ideas:	Notes:
Steps to Solving Radical Equations	Isolate the square root Square both sides
Example 1: Solving by Isolating the Radical	Solve. a. $\sqrt{x}+7=16$ $-7\ -7$ $(\sqrt{x})^2=(9)^2$ $x=81$ b. $\sqrt{3x-4}-7=2$ $+7\ +7$ $(\sqrt{3x-4})^2=(9)^2$ $3x-4=81$ $3x=85$ $x=\frac{85}{3}$
Now It's Your Turn	Solve. a. $\sqrt{x}-5=-2$ $+5\ +5$ $(\sqrt{x})^2=(3)^2$ $x=9$ b. $\sqrt{8x+2}-11=-8$ $+11\ +11$ $(\sqrt{8x+2})^2=(3)^2$ $8x+2=9$ $8x=7$ $x=\frac{7}{8}$
Solving Radical Equations with Two Square Roots	Put one square root on each side of the equal sign and then square them.
Example 2: Solving with Radical Expressions on Both Sides	Solve. a. $(\sqrt{5x-11})^2=(\sqrt{x+5})^2$ $5x-11=x+5$ $4x-11=5$ $4x=16$ $x=4$ Now It's Your Turn: Solve. b. $(\sqrt{2x-5})^2=(3\sqrt{7x})^2$ $2x-5=9\cdot 7x$ $2x-5=63x$ $-5=61x$ $x=-\frac{5}{61}$

Definition: Extraneous Solutions

An extraneous solution is an apparent solution that does not satisfy the original equation.

CHECK YOUR ANSWERS!!!

Example 3: Identifying Extraneous Solutions

Solve the following.

a. $(n)^2 = (\sqrt{n+12})^2$

$n^2 = n + 12$

$n^2 - n - 12 = 0$

$(n-4)(n+3) = 0$

$\boxed{n=4}$ $\cancel{-3}$

$-3 = \sqrt{-3+12}$

$-3 = \sqrt{9}$

$-3 \neq 3$

$4 = \sqrt{4+12}$

$4 = \sqrt{16}$

$4 = 4$

b. $\sqrt{3y} + 8 = 2$

$(\sqrt{3y})^2 = (-6)^2$

$3y = 36$

$y = \cancel{12}$

$\sqrt{3(12)} + 8 = 2$

$\sqrt{36} + 8 = 2$

$6 + 8 = 2$

$14 \neq 2$

$\boxed{\text{No Solution}}$

Now It's Your Turn

Solve the following.

a. $6 - \sqrt{2x} = 10$

$-\sqrt{2x} = 4$

$(\sqrt{2x})^2 = (-4)^2$

$2x = 16$

$x = 8$

$\boxed{\text{No Solution}}$

$6 - \sqrt{2 \cdot 8} = 10$

$6 - \sqrt{16} = 10$

$6 - 4 = 10$

$2 \neq 10$

b. $(-y)^2 = (\sqrt{y+6})^2$

$y^2 = y + 6$

$y^2 - y - 6 = 0$

$(y-3)(y+2) = 0$

$y = \cancel{3}, \boxed{-2}$

$-3 = \sqrt{3+6}$

$-3 = \sqrt{9}$

$-3 \neq 3$

$2 = \sqrt{-2+6}$

$2 = \sqrt{4}$

$2 = 2$

c. How can you determine that the equation $\sqrt{x} = -5$ does not have a solution without going through all the steps of solving the equation?

A square root can never equal a negative number

Summary: ____

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Algebra I
10.5 – Graphing Square Root Functions

Name ______________________
Date ______________ Class Period _______

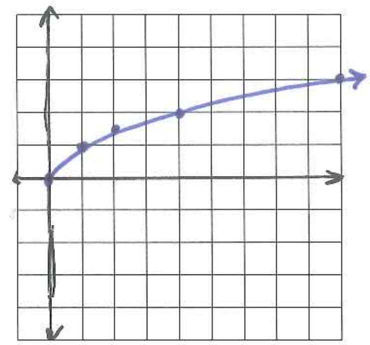
Learning Target: Today you will be able to GRAPH A SQUARE ROOT FUNCTION USING TRANSFORMATIONS AND FIND THE DOMAIN OF A SQUARE ROOT FUNCTION ALGEBRAICALLY

Questions/Main Ideas:	Notes:

Example 1: Graphing a Square Root with a Table

Graph $y = \sqrt{x}$ using the following table.

x	0	1	2	4	9
y	0	1	1.4	2	3

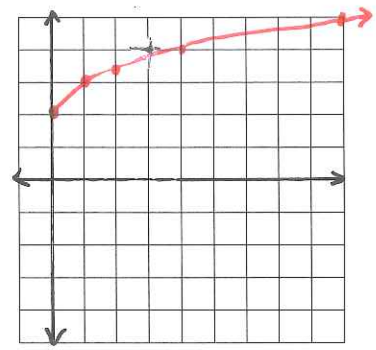


Now It's Your Turn

a. Graph $y = \sqrt{x} + 2$ using the following table.

x	0	1	2	4	9
y	2	3	3.4	4	5

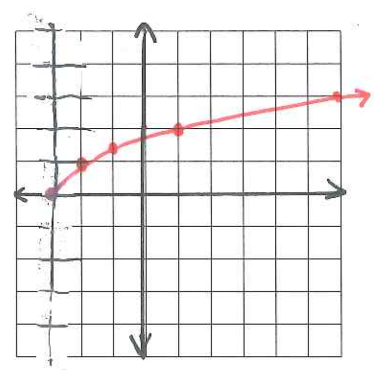
shifted up 2



b. Graph $y = \sqrt{x+3}$ using the following table.

x	-3	-2	-1	1	6
y	0	1	1.4	2	3

shifted left 3

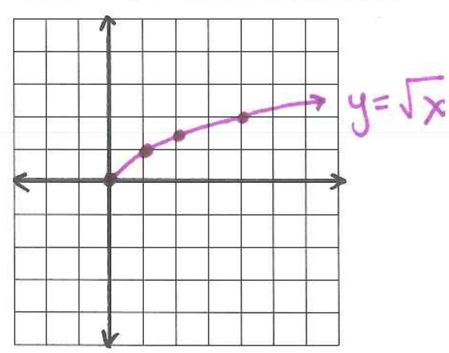


Concept: Square Root Functions

Parent Function: $y = \sqrt{x}$

$$y = \sqrt{x-h} + k$$

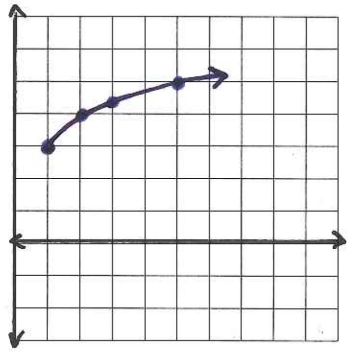
h – shifts horizontally
k – shifts vertically



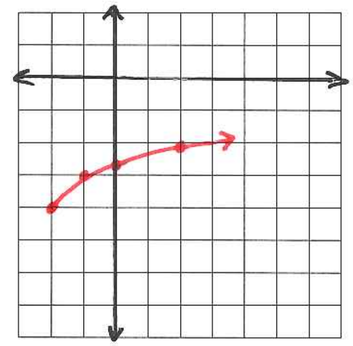
Example 2: Using Transformations to Graph

Graph each of the following without using a table.

a. $y = \sqrt{x-1} + 3$

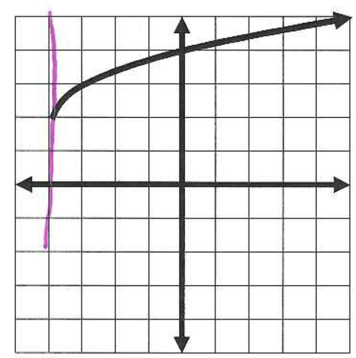


b. Your Turn: $y = \sqrt{x+2} - 4$



Review: Domain

The equation $y = \sqrt{x+4} + 2$ is represented in the graph below. Find the domain of the graph. Reminder: The domain is related to the "walls" of a graph.



a. Where is the left "wall"? 4

b. Where is the right "wall"? N/A

c. Domain: $x \geq -4$

d. Evaluate $y = \sqrt{x+4} + 2$ for x = -5.

$y = \sqrt{-5+4} + 2$

$= \sqrt{-1} + 2$ imaginary

e. Do you see any connections between the domain and the equation?

-4 is what makes the $\sqrt{\ }$ zero

f. What happens when you plug in a value for x that is not in the domain (see d)?

"error"

imaginary

Example 3: Find the Domain of a Square Root Function

Find the domain algebraically.

a. $y = 2\sqrt{3x-9}$

$3x - 9 \geq 0$

$3x \geq 9$

$x \geq 3$

b. Your Turn: $y = \sqrt{-2x+5}$

$-2x + 5 \geq 0$

$-2x \geq -5$

$x \leq 2.5$

Summary: ______________________________

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Algebra I
10.6 Day 1 – Trigonometric Ratios

Name ______________________________
Date _____________ Class Period _______

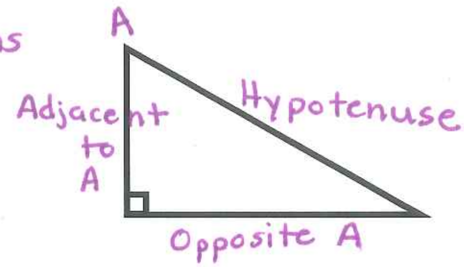
Learning Target: Today you will be able to USE TRIGONOMETRIC RATIOS TO FIND THE LENGTH OF A MISSING SIDE OF A RIGHT TRIANGLE

Questions/Main Ideas:	Notes:

Concept: Trigonometric Ratios

Ratios of the side lengths of a right triangle.

SOH CAH TOA
(see def'n below)



Name	Written	Definition
sine of ∠A	sin A	$\frac{\text{length of leg opposite } \angle A}{\text{length of Hypotenuse}}$ SOA
Cosine of ∠A	cos A	$\frac{\text{length of leg adjacent } \angle A}{\text{length of hypotenuse}}$ CAH
Tangent of ∠A	tan A	$\frac{\text{length of leg opposite } \angle A}{\text{length of leg adjacent } \angle A}$ TOA

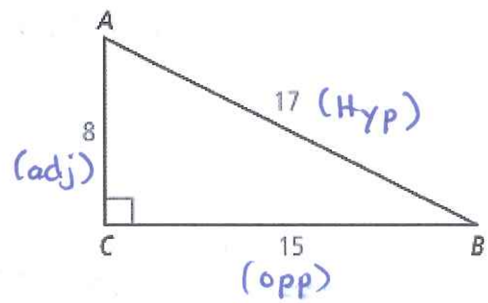
Example 1: Finding Trigonometric Ratios

What are sin *A*, Cos *A*, and tan *A* for the triangle shown?

$\sin A = \frac{opp}{hyp} = \frac{15}{17}$

$\cos A = \frac{adj}{Hyp} = \frac{8}{17}$

$\tan A = \frac{opp}{adj} = \frac{15}{8}$



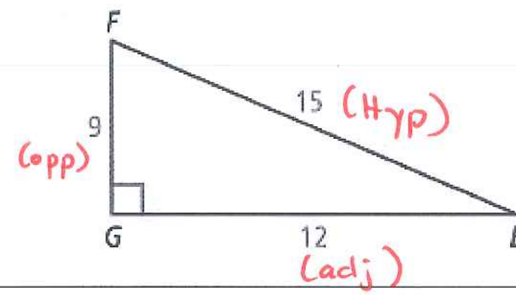
Now It's Your Turn

What are sin E, cos E, and tan E for the triangle below?

$\sin E = \frac{opp}{hyp} = \frac{9}{15} = \frac{3}{5}$

$\cos E = \frac{adj}{hyp} = \frac{12}{15} = \frac{4}{5}$

$\tan E = \frac{opp}{adj} = \frac{9}{12} = \frac{3}{4}$



Example 2: Finding a Trigonometric Ratio

What is the value of cos 55° to the nearest ten-thousandth?

$\cos 55° = 0.5736$ Use Calculator: Degree mode

Now It's Your Turn

What is the value of each expression in parts (a) – (d)? Round to the nearest ten-thousandth.

a. sin 80° $= 0.9848$

b. tan 45° $= 1$

c. cos 15° $= 0.9659$

d. sin 9° $= 0.1564$

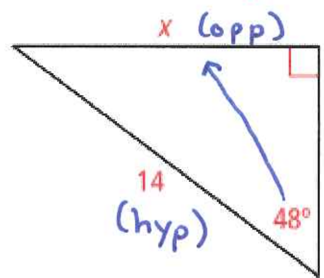
e. Describe the relationship between sin 45° and cos 45°. Explain why this is true.

$\sin 45 = 0.71$
$\cos 45 = 0.71$ } same

opposite = adjacent in 45-45-90 triangle

Example 3: Finding a Missing Side Length

Find the value of x. Round to the nearest tenth.



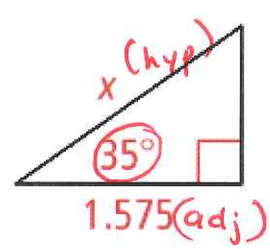
$\sin 48 = \frac{x}{14}$

$14 \cdot 0.74 = \frac{x}{\cancel{14}} \cdot \cancel{14}$

$\boxed{x = 10.4}$

Now It's Your Turn

Find the value of x. Round to the nearest tenth.



$\cos 35 = \frac{1.575}{x}$

$\frac{0.82}{1} = \frac{1.575}{x}$

$0.82x = 1.575$

$\boxed{x = 1.9}$

Summary: ______________________________

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Algebra I
10.6 Day 2 – Trigonometric Ratios

Name ______________________________
Date ______________ Class Period _______

Learning Target: Today you will be able to USE TRIGONOMETRIC RATIOS TO FIND THE MISSING ANGLE OF A RIGHT TRIANGLE AND USE TRIGONOMETRIC RATIOS TO SOLVE WORD PROBLEMS

Questions/Main Ideas:	Notes:
Review: Inverse Operations	Operations that undo each other. Addition ↔ subtraction Multiplication ↔ Division
Definition: Inverse Trigonometric Ratios	sin, cos, tan find the trig. ratios. If you know the ratios, $\sin^{-1}$, $\cos^{-1}$, $\tan^{-1}$, will find the angles.

Example 1: Finding an Angle using Inverse Trigonometric Ratios

Find the measure of angle A.

a. sin A = 0.75 $\boxed{\text{2nd sin}}$

$\sin^{-1}(0.75) = A$

$A = 48.6°$

Your Turn: Find the measure of angle E

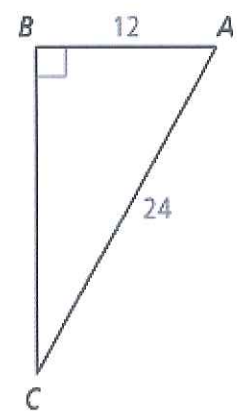
b. cos E = 0.32 $\boxed{\text{2nd cos}}$

$\cos^{-1}(0.32) = E$

$E = 71.3°$

Example 2: Finding the Measure of Angles

Find the measure of each angels in the triangle to the right.



$\sin C = \frac{12}{24}$

$\sin^{-1}\left(\frac{12}{24}\right) = C$

$\boxed{C = 30°}$

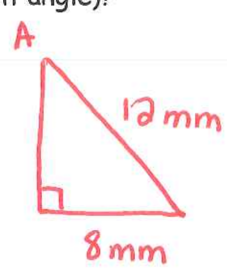
$\angle B = 90 - \angle C$

$\angle B = 90 - 30$

$\boxed{B = 60°}$

Now It's Your Turn

In a right triangle, the side opposite angle A is 8 mm long and the hypotenuse is 12 mm long. What is the measure of angle A? What is the measure of the third angle (not the right angle)?



$\sin A = \frac{8}{12}$

$\sin^{-1}\left(\frac{8}{12}\right) = A$

$\boxed{A = 41.8°}$

$90 - 41.8$

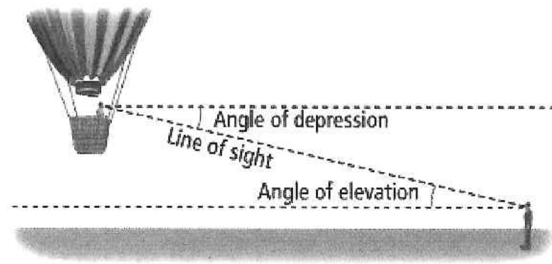
$\boxed{48.2°}$

Definition: Angle of Elevation

An angle from the horizontal up to a line of sight

Definition: Angle of Depression

An angle from the horizontal down to a line of sight



Example 3: Using an Angle of Elevation or Depression

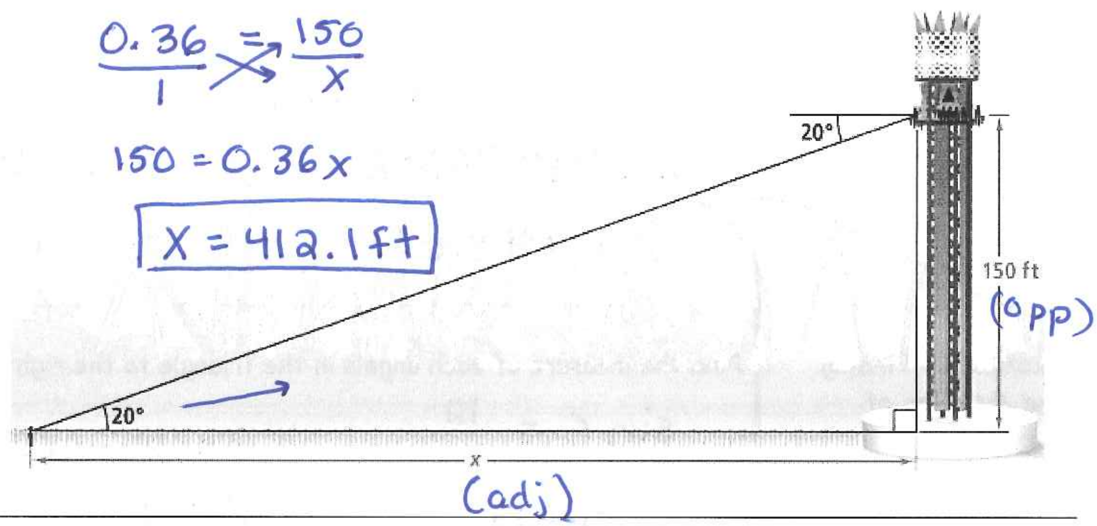
Suppose you are waiting in line for a ride. You see your friend at the top of the ride. How far are you from the base of the ride?

$\tan 20 = \frac{150}{x}$

$\frac{0.36}{1} = \frac{150}{x}$

$150 = 0.36x$

$\boxed{x = 412.1\text{ft}}$



Now It's Your Turn

After you move forward in line, the angle of elevation to the top of the ride becomes 50°. How far are you from the base of the ride now?

$\tan 50° = \frac{150}{x}$

$\frac{1.19}{1} = \frac{150}{x}$

$150 = 1.19x$

$\boxed{x = 125.8\text{ ft}}$

Summary: ______________________________

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