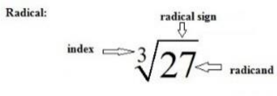
Square Root Functions
§10.1

<u>Square Root Function</u> – contains the square root of the variable.

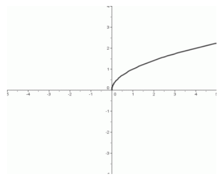


Parent Function: $f(x) = \sqrt{x}$

Type of Graph: Curve

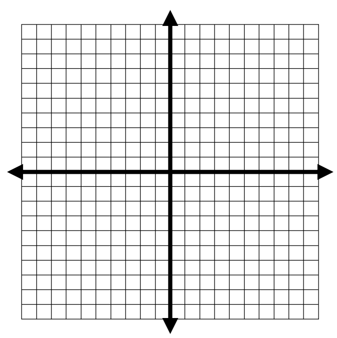
Domain: $x \geq 0$

Range: $y \geq 0$



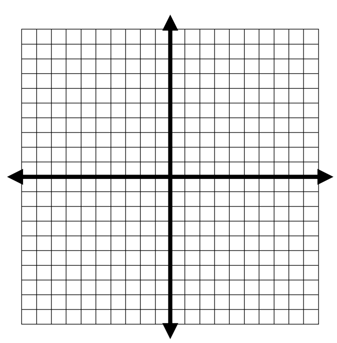
<u>Example 1</u>

Graph $f(x) = 2\sqrt{x}$ and state the domain and range.



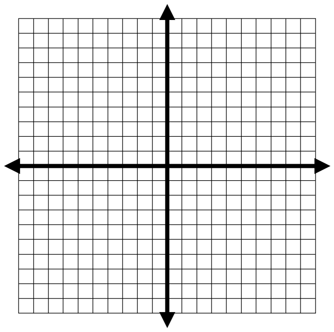
<u>Example 2</u>

Graph $f(x) = \frac{1}{3}\sqrt{x}$ and state the domain and range.



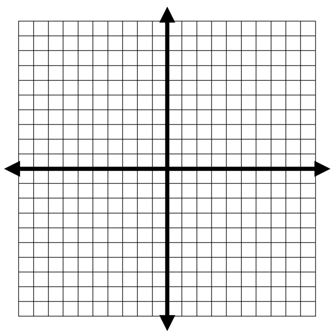
Example 3

Graph $g(x) = \sqrt{x} + 3$ and state the domain and range.



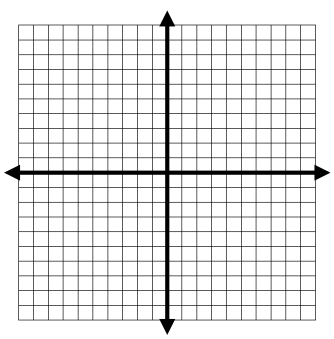
Example 4

Graph $h(x) = \sqrt{x - 4}$ and state the domain and range.



Example 5

Graph $h(x) = -3\sqrt{x} + 1$ and state the domain and range.



Pg 608,1-7,11-17,23-29,35,37 odds

Simplifying Radical Expressions
§10.2

<u>Radical Expression</u> – contains a radical ($\sqrt{}$)

<u>Perfect Square List</u>

Simplify Each.

<u>Example 1</u>

$\sqrt{52}$

<u>Example 2</u>

$\sqrt{80}$

<u>Example 3</u>

$\sqrt{54}$

<u>Example 4</u>

$\sqrt{2} \cdot \sqrt{14}$

$\sqrt{x^2} = x$????? (what if x = -3)

Even Root, Odd Exponent = $\left| x \right|$

<u>Example 5</u>

$\sqrt{45a^4b^5c^6}$

<u>Example 6</u>

$\sqrt{90x^2y^4z^5}$

<u>Example 7</u>

$\sqrt{\frac{7}{3}}$

<u>Example 8</u>

$\sqrt{\frac{10}{25}}$

<u>Example 9</u>

$\frac{2}{4 - \sqrt{5}}$

<u>Example 10</u>

$\frac{6}{2 + \sqrt{3}}$

Pg 615,1-33,37-47 odds

Operations with Radical Expressions
§10.3

Like Terms with Radicals

To add or subtract radical expressions, the radicands (inside $\sqrt{\ }$) must be the same.

Example 1

$6\sqrt{3} + 5\sqrt{3}$

Example 2

$8\sqrt{5} - 3\sqrt{5} + 7\sqrt{5}$

Example 3

$4\sqrt{7} + 12\sqrt{13} + 9\sqrt{7} - 5\sqrt{13}$

Example 4

$6\sqrt{27} + 8\sqrt{12} + 2\sqrt{75}$

Example 5

$\sqrt{24} - \sqrt{54} + \sqrt{96}$

Example 6

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

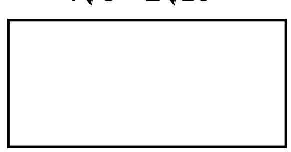
Example 7

$4\sqrt{2}\,(3\sqrt{2} + 2\sqrt{6})$

Example 8

Find the area of the rectangle in simplest form

$4\sqrt{6} - 2\sqrt{10}$



$5\sqrt{3} + 7\sqrt{5}$

Pg 621,1-28

Radical Equations
§10.4

Radical Equations – equations that contain variables in the radicand ($\sqrt{x}$).

Solve.

Example1

$\sqrt{x - 3} + 8 = 15$

Example 2

$4 + \sqrt{h + 1} = 14$

Extraneous Solutions – solutions that do not satisfy the original equation.   MUST CHECK SOLUTIONS

Example 3

$\sqrt{2 - y} = y$

Example 4

$x - 3 = \sqrt{x - 1}$

Example 5

$\sqrt{x + 5} = x + 3$

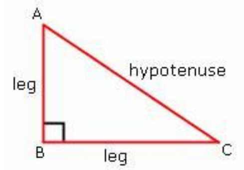
Example 6

An object is dropped from an unknown height and reaches the ground in 5 seconds. Use the equation $t = \dfrac{\sqrt{h}}{4}$, where t is time in seconds and h is height in feet, to find the height from which the object was dropped.

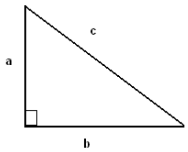
Pg 626,1-27 odds

The Pythagorean Theorem
§10.5

<u>Right Triangle</u> – a triangle that contain exactly one 90 degree angle.



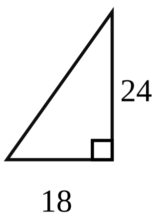
<u>Pythagorean Theorem</u>



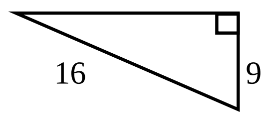
$$a^2 + b^2 = c^2$$

Find the missing length to the nearest hundredth.

<u>Example 1</u>



<u>Example 2</u>

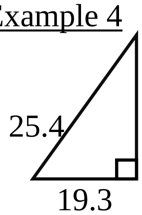


<u>Example 3</u>

Tim recently bought a 62 inch television for his man cave in the basement. The length is $50\frac{1}{4}$ inches. Find the height.

Find the missing length to the nearest hundredth.

<u>Example 4</u>



Converse of Pythagorean Theorem

If $a^2 + b^2 = c^2$,then you have a right triangle.

If $a^2 + b^2 \neq c^2$,then you do not have a right triangle.

Determine whether the following can be sides of a right triangle.

Example 5

7, 11, 16

Example 6

9, 12, 15

Pg 632,18-37

The Distance and Midpoint Formulas

§10.6

Distance Formula – the distance between two points with coordinates (x_1, y_1) *and* (x_2, y_2) is given by the formula:

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

Find the distance between the two points

Example 1

(1, 2) and (-3, 0)

Example 2

(1, -2) and (5, 3)

Example 3

(-5, -8) and (-7, -2)

Example 4

Find the possible values for *a* if the distance between points (2, -1) and (*a*, -4) is 5.

Midpoint Formula – the midpoint M of a line segment with endpoints (x_1, y_1) *and* (x_2, y_2) is given by the formula:

$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

Find the coordinates of the midpoint given the endpoints.

Example 5

(8, -3) and (-4, -1)

Example 6

(6, 8) and (3, 4)

Pg 639,19-47 odds

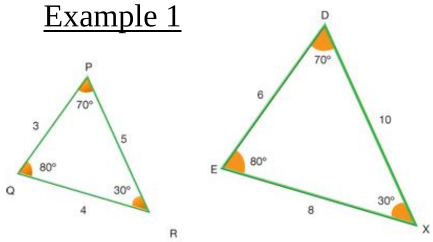
Similar Triangles
§10.7

<u>Similar Triangles</u> – triangles that have the same shape but not the same size.

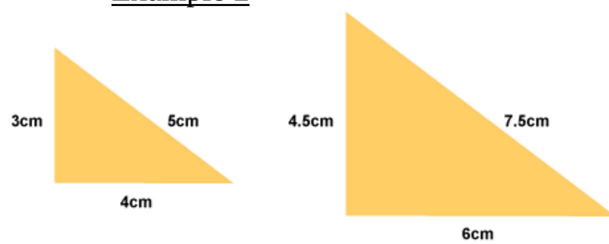
<u>Similar Triangles</u>
1. Corresponding Angles are Equal
2. Corresponding Sides are Proportional

Determine whether the two triangles are similar.

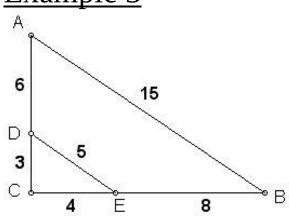
<u>Example 1</u>



<u>Example 2</u>

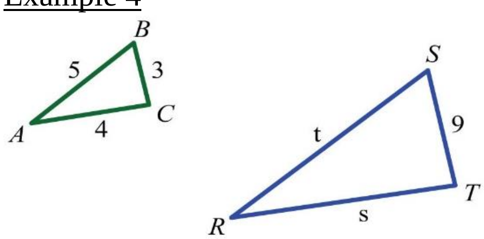


<u>Example 3</u>

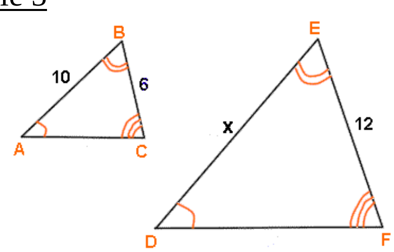


Find the missing measure(s) for the pair of similar triangles.

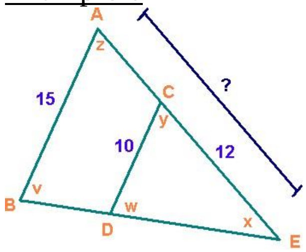
<u>Example 4</u>



<u>Example 5</u>



Example 6



Example 7

Jessica is 5 feet 6 inches tall and her shadow is 3 feet. She is standing next to a tree that casts a shadow of 7.5 feet long, how tall is the tree?

Pg 644,1-23,35-45 odds

Trigonometric Ratios
§10.8

Trigonometry – the study of the properties of triangles and trigonometric functions and their applications.

Trigonometric Ratios
1. sine (sin)
2. cosine (cos)
3. tangent (tan)

SOH CAH TOA

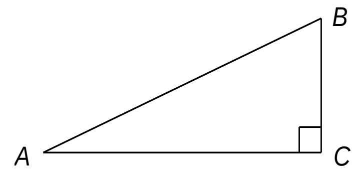
$\sin = \dfrac{\text{opposite}}{\text{hypotenuse}}$

$\cos = \dfrac{\text{adjacent}}{\text{hypotenuse}}$

$\tan = \dfrac{\text{opposite}}{\text{adjacent}}$

sin A =
cos A =
tan A =

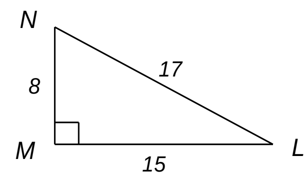
sin B =
cos B =
tan B =



Example 1
Express each as a fraction and decimal (nearest thousandth).

sin L =
cos L =
tan L =

sin N =
cos N =
tan N =

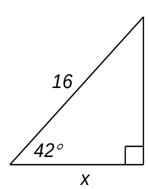


Example 2
Use a calculator to find each value (round to the nearest ten-thousandth).

a. sin 63

b. cos 41

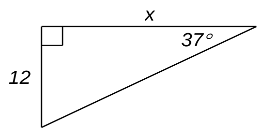
Example 3
Find *x*.



Example 4
A fitness trainer sets the incline for a treadmill to $7°$. If the length of the walking surface is 5 ft., how many inches was the treadmill raised from the floor?

Example 5

Find *x*.



To find an Angle:

1. $\sin^{-1}$
2. $\cos^{-1}$
3. $\tan^{-1}$

Example 6

Find the measure of each angle to the nearest tenth of a degree.

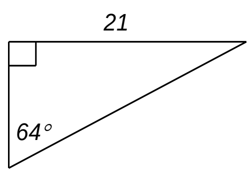
a. cos A = .7215

b. tan A = .3148

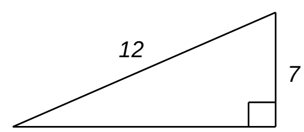
Example 7

Find all remaining parts of the triangle.

a.



b.



Pg 652,1-41 odds