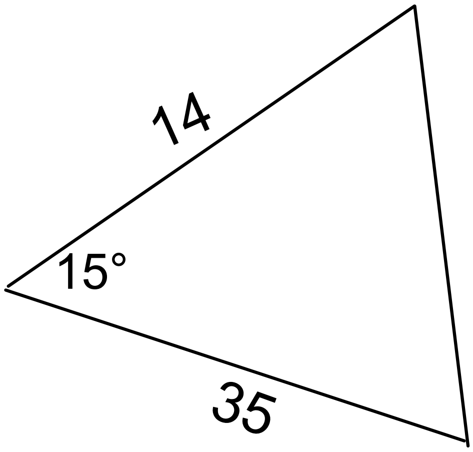
Bellwork: Find the area of the triangle below

$A = \frac{1}{2}ab\sin(C) = \frac{1}{2}(14)(35)\sin(15)$

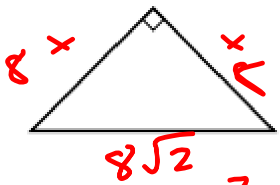


$= 63.41 \text{ unit}^2$

Bellwork: ACT Prep

What is the perimeter, in inches, of the isosceles right triangle shown below, whose hypotenuse is $8\sqrt{2}$ inches long?

A. 8
B. $8 + 8\sqrt{2}$
C. $8 + 16\sqrt{2}$
~~**D.** 16~~
E. $16 + 8\sqrt{2}$



$x^2 + x^2 = (8\sqrt{2})^2$

$\frac{2x^2}{2} = \frac{64 \cdot 2}{2}$

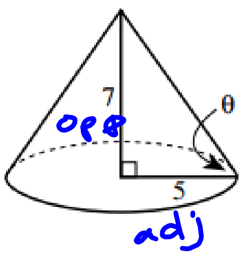
$\sqrt{x^2} = \sqrt{64}$

$x = 8$

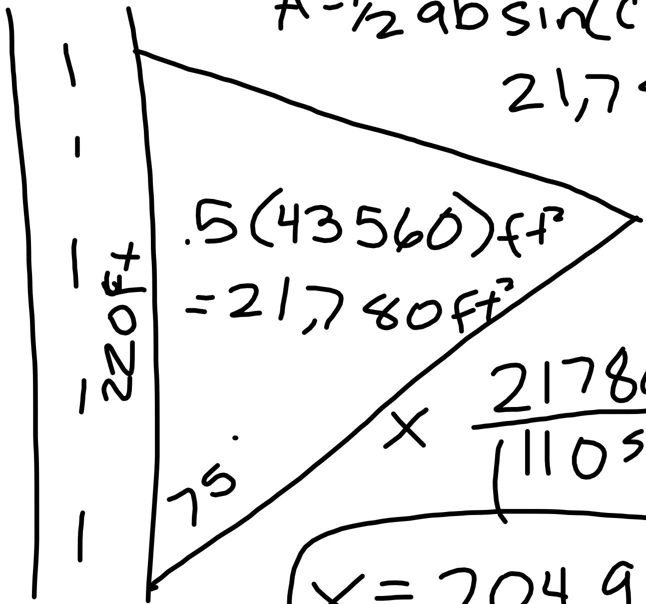
TOA

The radius of the base of the right circular cone shown below is 5 inches, and the height of the cone is 7 inches. Solving which of the following equations gives the measure, θ, of the angle formed by a slant height of the cone and a radius?

F. $\tan \theta = \frac{5}{7}$
G. $\tan \theta = \frac{7}{5}$
H. $\sin \theta = \frac{5}{7}$
J. $\sin \theta = \frac{7}{5}$
K. $\cos \theta = \frac{7}{5}$



9)



$.5(43560)\text{ft}^2$
$= 21{,}780\text{ft}^2$

$A = \frac{1}{2}ab\sin(C)$

$21{,}780 = \frac{1}{2}(220)x \cdot \sin(75)$

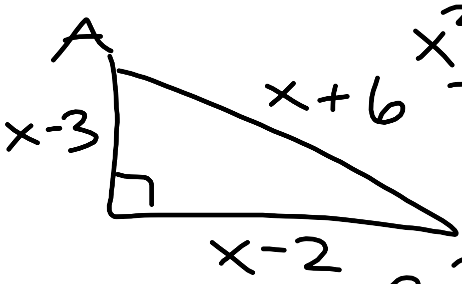
$$\frac{21780}{110\sin 75} = \frac{\cancel{110}x\,\cancel{\sin 75}}{\cancel{110}\,\cancel{\sin(75)}}$$

$\boxed{x = 204.985\text{ ft}}$

Homework 7.1 Solutions

1. 222.332 ft^2
2. ~~4.26~~ 4.256 in^2
3. 5.290 cm^2
4. 297.258 m^2
5. 17.973 ft^2
6. 156.504 mm^2
7. 128.079 m^2
8. 107.979 cm^2
9. 204.985 ft

Homework 7.1 Solutions



$$(x-3)^2+(x-2)^2=(x+6)^2$$

$$\underbrace{x^2-6x+9+x^2-4x+4}=x^2+12x+36$$

$$2x^2-10x+13=\cancel{x^2}+\cancel{12x}+\cancel{36}$$

$$-x^2-12x-36 \quad -x^2-12x-36$$

-23
-23 1
-22

$$x^2-22x-23=0$$

$$(x-23)(x+1)=0$$

$$\boxed{x=23,\ \cancel{-1}}$$

$$\tan A=\frac{x-2}{x-3}=\boxed{\frac{21}{20}}$$

Lesson 7.2 Objectives

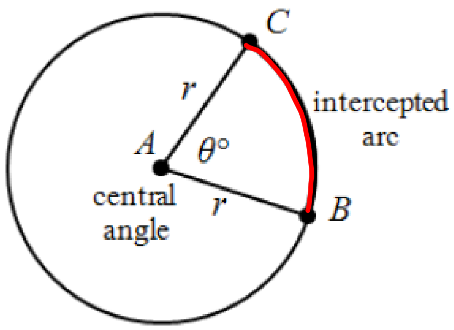
I can convert between radians and degrees

I can use properties of special right triangles to solve for missing sides

Vocabulary:

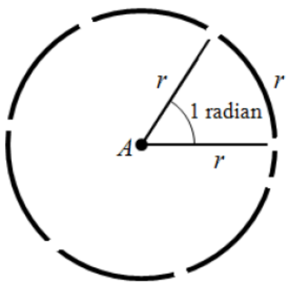
An angle with its vertex at the center of the circle is called a **central angle**.

An **intercepted arc** is the portion of a circle with endpoints on the sides of the central angle and remaining points within the interior of the angle.



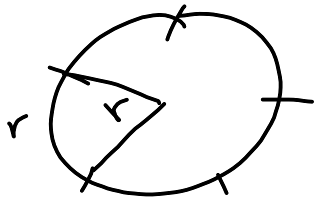
Vocabulary:

A **radian,** much like an angle in degrees, measures the amount of rotation from the initial side to the terminal side of an angle in terms of the radius.



Given a circle, if an arc is drawn on the circumference so that the length of the arc is equal to the radius of the circle, then the central angle is 1 **radian.** The number of radians in a circle is equal to the number of times the radius divides into the circumference. Mathematically, $\frac{C}{r} = \frac{2\pi r}{r} = 2\pi$. Therefore, like there are 360° in a circle, there are 2π radians.

$$C = \frac{2\pi \cancel{r}}{\cancel{r}} = 2\pi$$



Converting between degrees and radians:

The fact that there are 2π radians in a circle allows us to convert between degrees and radians.

360 degrees = 2π radians   180 degrees = π radians

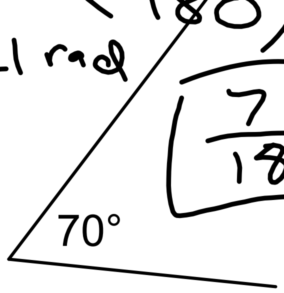
- Degrees to Radians: $\text{Radians} = \text{Degrees}\left(\frac{\pi}{180}\right)$
- Radians to Degrees: $\text{Degrees} = \text{Radians}\left(\frac{180}{\pi}\right)$

Convert the following to angles measures to radians

$70\left(\frac{\pi}{180}\right)$

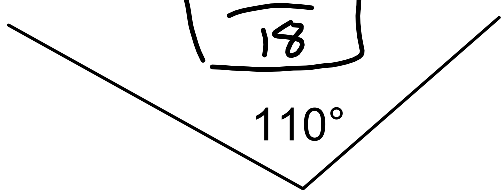
1.221 rad

$\boxed{\frac{7\pi}{18}}$



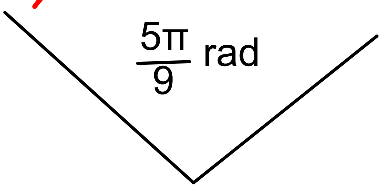
1.91 rad

$\boxed{\frac{11\pi}{18}}$



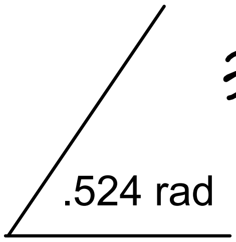
Convert the following angle measures to degrees

$$\frac{5\cancel{\pi}}{\cancel{9}}\left(\frac{\overset{20}{\cancel{180}}}{\cancel{\pi}}\right) = 100^\circ$$



$$.524\left(\frac{180}{\pi}\right)$$

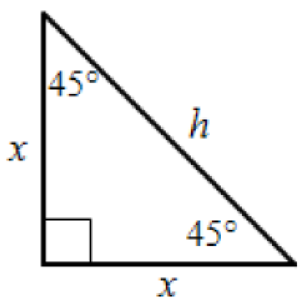
$$30.02^\circ$$



Special Right Triangles

There are special right triangles with special relationships between the lengths of their sides. These relationships can be used to simplify calculations when finding missing angles and sides.

45°-45°-90° Triangle



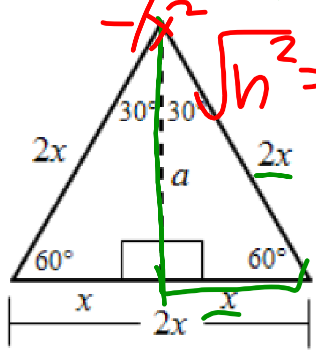
30°-60°-90° Triangles

$$\cancel{x^2} + h^2 = (2x)^2$$

$$-x^2 \qquad -x^2$$

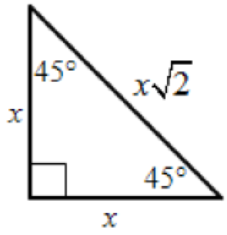
$$\sqrt{h^2} = \sqrt{3x^2}$$

$$h = x\sqrt{3}$$



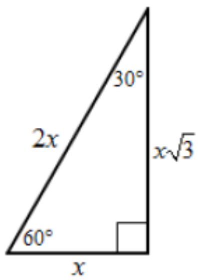
$45° - 45° - 90°$ Triangle

In any $45° - 45° - 90°$ triangle, the length of the hypotenuse is $\sqrt{2}$ times the length of its leg.

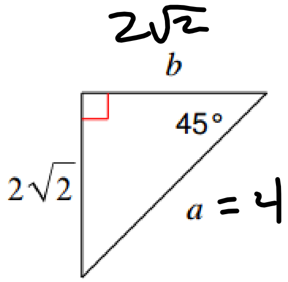


$30° - 60° - 90°$ Triangles

In any $30° - 60° - 90°$ triangle, the length of the hypotenuse is twice the length of the shorter leg, and the length of the longer leg is $\sqrt{3}$ times the length of the shorter leg.



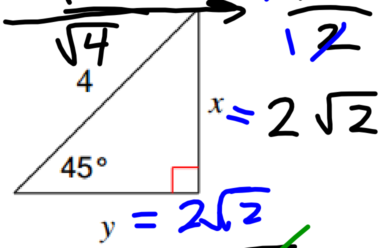
Find the missing sides of the special right triangle



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

$2\sqrt{4} = 2(2)$

$x = \frac{4}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} \quad \frac{4\sqrt{2}}{\sqrt{4}} \rightarrow \frac{2\cancel{4}\sqrt{2}}{1\cancel{2}}$



$4 = x\sqrt{2}$

$\frac{4}{\sqrt{2}} = \frac{x\cancel{\sqrt{2}}}{\cancel{\sqrt{2}}}$

$x = 2\sqrt{2}$

Find the missing sides of the special right triangle