Warm up
Evaluate the following

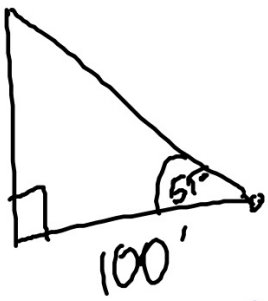
1. arccos (Sin(4π/3)))
2. Sin (arctan(0))
3. arccos (tan(-π/4))
4. Tan (arccos(-1/2))
5. Cos (arcsin(√3/2))
6. arcsin (sin(5π/4))

Solve application problems with right triangles.

1. A surveyor stands 100 feet from a building and sights the top of the building at a 55° angle of elevation. Find the height of the building.

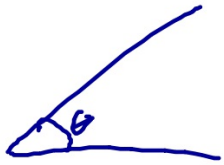
$\tan 55 = \frac{h}{100}$

$100 \tan 55 = h$



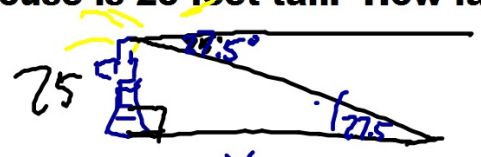
$h = 142.8'$ . . .

2. A geologist measured an angle of elevation to the top of a mountain to be 40° when he was 20 km away. How tall is the mountain?



3. A wheel chair ramp needs to be placed 15 feet away from a building with an elevation of 12°, how long should the ramp be?

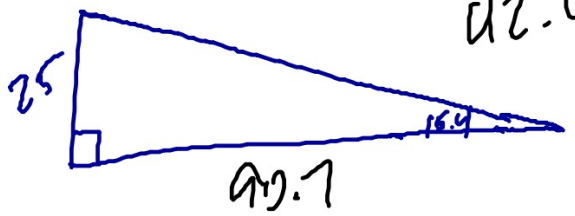
5. The angle of depression from the top of a light house to a boat at sea is 27.5° and the lighhouse is 25 feet tall. How far is the boat from the light house?



A.I. $\frac{25}{x} = \tan 27.5$

$x = 48.02$ $x = \frac{25}{\tan 27.5}$

The angle of depression to a second boat is 15.4°, how far apart are the boats?



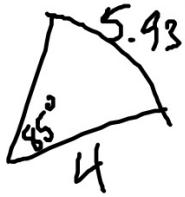
$x = 92.66$

To find the arc length of a circle the central angle θ which must be in radians. $\boxed{s = r\theta}$

s = arc length
r = radius
θ = angle

Examples

1. Find the arc length that has an angle of 85° and a diameter of 8.



$\frac{85\pi}{180}$

27.42"

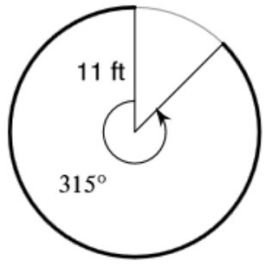
2. Find the perimeter of a 60° slice of pizza that has a diameter of 18 inches?

$9 \cdot \frac{\pi}{3}$:

θ

Find the length of each arc. Round your answers to the nearest tenth.

1)

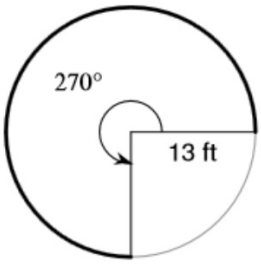


[redacted]

$315 \cdot \frac{\pi}{180}$.

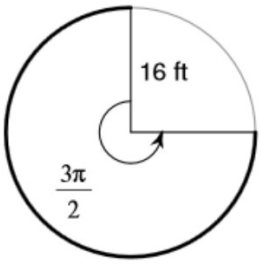
60.5 ft

2)



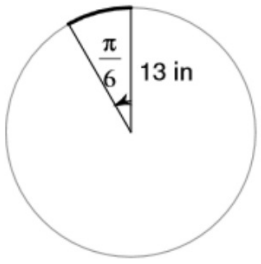
[redacted]

3)



[redacted]

4)



[redacted]

Linear Speed v = s/t How fast an object moves through an arc. Measured in units like miles per hour

Examples

The roller, with a radius of 10 in., travels 58.2 revolutions per minute. Find its linear speed in mph

$$\frac{58.2\ \text{rev}}{1\ \text{min}} \cdot \frac{10\ \text{in}}{1\ \text{rad}} \cdot \frac{2\pi\ \text{rad}}{1\ \text{rev}} = \frac{3656.8\ \text{in}}{1\ \text{min}}$$

$$\frac{3656.8\ \text{in}}{1\ \text{min}} \cdot \frac{1\ \text{ft}}{12\ \text{in}} \cdot \frac{1\ \text{mile}}{5280\ \text{ft}} \cdot \frac{60\ \text{min}}{1\ \text{hr}} = 3.46\ \text{mph}$$

44. Automobile Design Table 4.1 shows the size specifications for the tires that come as standard equipment on three different American vehicles.

Table 4.1 Tire Sizes for Three Vehicles

Vehicle	Tire Type	Tire Diameter
Ford Taurus	215/60–16	26.16 inches
Dodge Charger RT	225/60–18	28.63 inches
Mercury Mariner	235/70–16	28.95 inches

(a) Find the speed of each vehicle in mph when the wheels are turning at 800 revolutions per minute.