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# Trigonometric Functions

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## Chapter 4

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# Angles and Their Measures

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4.1

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# Radian

Degrees have no mathematical relationship whatsoever to linear units. In trig functions, the input is an angle measure and the output is a real number and often a unit of length. If the input and the output of a function need to be measured on a comparable scale, then the input needs to be a unit of length. This leads to radians.

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## Radian

A central angle of a circle has measure 1 radian if it intercepts an arc with the same length as the radius.

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# Radians.

- Draw a circle.
  - Highlight a radius.
  - Cut a strip of paper the same length as the radius.
  - What is the circumference of the circle in terms of its radius?
  - How many radii does it take to cover the circle?
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# Degree to Radian Conversion

- 180 degrees is equivalent to  $\pi$  radians.
  - How many radians are in 90 degrees?
  - How many degrees are in  $3\pi$  radians?
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# Circumference of a Circle

$$C = 2\pi r$$



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## Arc Length Formula ( $\theta$ in radians)

If Intercepted arc length =  
radius length, then the  
central angle's measure is 1  
radian.

$$s = r \theta$$

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## Degree Arc Length

- Convert Degrees to radians, then  $S = r \theta$ .
  - Or  $s = (\theta/360) * 2\pi r$
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Find  $s$ ,  $r$  or  $\theta$

- 26, 28, 32, 34

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# Arc Length Story Problems

- 36,38



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# Angular and Linear Motion Story Problems

- 1 Revolution = 1 circumference
  - 5,280 ft = 1 mile
  - Unit Analysis
  - Given that a Ford Taurus has a diameter of 26.16 inches, find the revolutions per minute the wheels are making if the car is traveling at a speed of 62.26 mph?
  - 44a  $65746.56/82.18$
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# Homework

Pg. 358-391 17-37 odd, 45,47

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