Section 5.2 Learning Objectives:

- Video 1a (5:41): Measuring Angles (Part 1)
  - Understand the measurements of angles using degrees and radians.
- Video 1b (10:14): Measuring Angles (Part 2)
  - Convert angle measurements between degrees and radians.
  - Determine coterminal angles.
- Video 2 (6:18): The Common Angles of the Unit Circle
  - State the common angles of the unit circle in both degrees and radians.
- Video 3 (12:00): Arc Length and Area
  - Determine the length of a circular arc.
  - Determine the area of a sector of a circle.
- Video 4 (8:54): Linear and Angular Velocity
  - Apply the circle concepts to linear and angular velocities.

Individual Learning Objective Binder Check: Before class, you should have complete the Learning Objective Worksheet for each of the learning objectives in the video. These should have been placed in a binder in an organized manner so that it can be quickly checked by the instructor. If you have specific questions, this is a good time to ask the professor about them. While you are waiting for the professor to make their way around the room, you can work on the rest of the activities.

Group Practice Problems: In a group of no more than 3 students, work on the following problems. While everyone in the group should work together, each student should write out their work for themselves. This work can prove to be helpful when working on the homework assignment. If questions arise as you're working on these problems, feel free to seek help from the instructor or other groups of students.

Group Practice Problems #1 - Converting Between Degrees and Radians: Perform the following conversions. Show your conversion factor and the cancellation of units.

- Convert $\frac{7\pi}{10}$ radians to degrees.
- Convert $15°$ to radians.

Group Practice Problems #2 - Coterminal Angles: Draw the angle in standard position, indicating the number of times the angle has wrapped around the origin. Then determine an angle coterminal to given angle in the interval $[0, 2\pi)$ or $[0°, 360°)$, depending on the units of the original angle.

- $955°$
- $\frac{35\pi}{6}$
- $-700°$
- -1 (radians)

Group Practice Problems #3 - Unit Circle: Sketch two unit circles and label all of the common angles that are included in the standard diagram. Use degrees in one diagram and radians in the other.

Group Practice Problems #4 - Circular arcs: Draw a diagram that matches the description and answer the question.

- Determine the arc length of a $15°$ arc of a 3 inch circle.
- Determine the arc length of a $\frac{3\pi}{4}$ radian arc of a 2 meter circle.
- An arch top window is a rectangular window with a circular arc across the top. A particular window is 3 feet wide and 4 feet tall, and it uses a full semicircle for the arc. Determine the perimeter of this window measured in feet. Give an exact answer and a decimal approximation to two decimal places.

Group Practice Problems #5 - Areas of Sectors: Draw a diagram that matches the description and answer the question.

- The area of a $\frac{7\pi}{6}$ radian sector of a circle with a 5 foot radius.
- An 18-inch (diameter) pizza is cut into wedges. The central angle of one of the wedges is measured to be $35°$. Determine the area of the pizza. (The central angle of the slice of pizza is measured at the "tip" of the pizza. Assume that the slices have straight sides and that the tip is the center of the pizza.)

Group Practice Problems #6 - Circular motion:

- A bicycle with a 24-inch diameter wheel is traveling at 15 miles per hour. Determine the angular speed of the wheels in radians per minute. How many revolutions per minute do the wheels make?

Group Work Check: Present your work for the practice problems to the instructor for approval. The work will not be graded deeply, but simply graded on whether it appears that you have put in a good faith effort to do the work. If you are not confident about particular problems, this is a good time to ask about them.

Section 5.2 Homework: Homework problems are listed with their associated videos if you get stuck. Some problems are listed as "Stretch Problems" that may require you to think beyond what was presented in the video and combine multiple ideas together to complete successfully.

- 5.2 (General Problems): #3, 5, 7, 9, 11, 15, 19, 23, 25, 29
- 5.2 (Write-ups): #31, 32