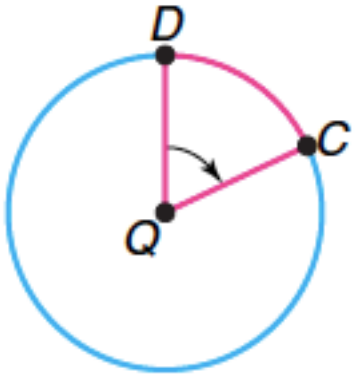
1.7.16
6.1, 6.2
Area of a sector, Linear and Angular Velocity
Lesson 2

Area of a sector.
If θ is the measure of the central angle expressed in radians and r is the measure of the radius of the circle, then the area of the sector, A, can be found by

$$A = \frac{1}{2}r^2\theta$$

I try:
Find the area of a sector if the central angle is $\frac{5\pi}{6}$ radians and the radius of the circle is 16 cm. Round to the nearest tenth.



Plug in givens.	
Simplify and solve.	

We Try:

Find the area of a sector if the central angle is 30° and the radius of the circle is 4 cm. Round to the nearest tenth.

Plug in givens.	
Simplify and solve.	

You Try SOLO on whiteboards:

Find the area of a sector if the central angle is $\pi/6$ and the radius of the circle is 2 cm. Round to the nearest tenth.

Plug in givens.	
Simplify and solve.	

Angular Displacement is the angular rotation.

I do:
Determine the angular displacement in radians. Round to the nearest tenth.

4 revolutions.

Multiply revolutions with 2π	
Solve using a calculator	

We do:
3.5 revolutions

Multiply revolutions with 2π	
Solve using a calculator	

You do Solo on whiteboards:

9 revolutions

Multiply revolutions with 2π	
Solve using a calculator	

Dimension Analysis is when unit labels are treated as mathematical factors that can be divided out.

IE: Convert 15 Hours to seconds.

Angular Velocity is the ratio of the change of the central angle to the time required for the change.

If an object moves along a circle during a time of $\boldsymbol{t}$ units, then the angular velocity **ω,** is given by

$$\boldsymbol{\omega = \frac{\theta}{t}}$$

I do:
Determine the angular velocity. Round to the nearest tenth.
28.4 revolutions in 19 seconds.

Identify the givens	$\boldsymbol{revolutions = 28.4}$ $\boldsymbol{t = 19\ seconds}$
$\boldsymbol{Solve\ for\ the\ radians\ if\ necessary.}$	
Plug into formula. $\boldsymbol{\omega = \frac{\theta}{t}}$	
Simplify and Solve	

We do:
Determine the angular velocity. Round to the nearest tenth.
7.3 revolutions in 10 minutes.

Identify the givens	$\boldsymbol{revolutions = 7.3\ revolutions}$ **t=10 minutes.**
$\boldsymbol{Solve\ for\ the\ radians\ if\ necessary.}$	
Plug into formula. $\boldsymbol{\omega = \frac{\theta}{t}}$	
Simplify and Solve	

You try with your partner on the whiteboard:
Left Talk, Right Write.

Determine the angular velocity. Round to the nearest tenth.
80 revolutions in 2 minutes.

Identify the givens	
$\boldsymbol{Solve\ for\ the\ radians\ if\ necessary.}$	
Plug into formula. $\boldsymbol{\omega = \frac{\theta}{t}}$	
Simplify and Solve	

You try Solo on whiteboards:
Determine the angular velocity. Round to the nearest tenth.
.5 revolutions in 2 seconds.

Identify the givens	
$\boldsymbol{Solve\ for\ the\ radians\ if\ necessary.}$	
Plug into formula. $\boldsymbol{\omega = \frac{\theta}{t}}$	
Simplify and Solve	

Linear Velocity is the speed at which an object moves a distance over time.

If an object moves along a circle of a radius of $\boldsymbol{r}$ units, then its linear velocity, $\boldsymbol{v}$ is given by $\boldsymbol{v = r\frac{\theta}{t}}$

Where $\boldsymbol{\frac{\theta}{t}}$ represents the angular velocity in radians per unit of time.

$$\boldsymbol{v = r\omega}$$

I do:

Determine the linear velocity of a point rotating at an angular velocity of 17π radians per second at a distance of 5 cm from the center of the rotating object. Round to the nearest tenth.

Identify the desired formula. Linear velocity $v = r\frac{\theta}{t}$ or $\boldsymbol{v = r\omega}$ Angular Velocity = $\boldsymbol{\omega = \frac{\theta}{t}}$	
Plug in the givens	
Simplify and solve	

We do:

Determine the linear velocity of a point rotating at an angular velocity of 64π radians per second at a distance of 10 m from the center of the rotating object. Round to the nearest tenth.

Identify the desired formula. Linear velocity $v = r\frac{\theta}{t}$ or $\boldsymbol{v = r\omega}$ Angular Velocity = $\boldsymbol{\omega = \frac{\theta}{t}}$	
Plug in the givens	
Simplify and solve	

You Try with your partner:

Right Talk, Left Write.

Determine the linear velocity of a point rotating at an angular velocity of 14π radians per second at a distance of 3ft. from the center of the rotating object. Round to the nearest tenth.

Identify the desired formula. Linear velocity $v = r\frac{\theta}{t}$ or $\boldsymbol{v = r\omega}$ Angular Velocity = $\boldsymbol{\omega = \frac{\theta}{t}}$	
Plug in the givens	
Simplify and solve	

You try SOLO on whiteboards:
Determine the linear velocity of a point rotating at an angular velocity of 2.5π radians per second at a distance of 3.6 ft. from the center of the rotating object. Round to the nearest tenth.

Identify the desired formula. Linear velocity $v = r\frac{\theta}{t}$ or $\boldsymbol{v = r\omega}$ Angular Velocity = $\boldsymbol{\omega = \frac{\theta}{t}}$	
Plug in the givens	
Simplify and solve	

Exit Slip

1) Find the area of a sector if the central angle is $\frac{\pi}{6}$radians and the radius of the circle is 4 cm. Round to the nearest tenth.

2) Determine the linear velocity of a point rotating at an angular velocity of 1.1π radians per second at a distance of 2.5 cm from the center of the rotating object. Round to the nearest tenth.

3) Determine the angular velocity. Round to the nearest tenth.
1.3 revolutions in 2 minutes.

4) Determine the angular displacement in radians. Round to the nearest tenth.
1.6 revolutions.