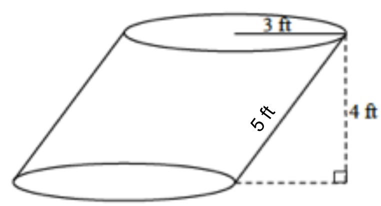
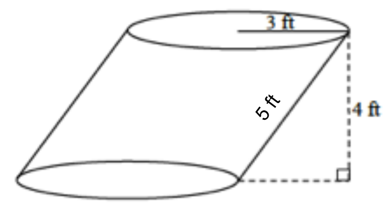
HW Check:

Chapter 9 Closure: Answers and resources at end of chapter.

Warmup in Your Spiral: Compute the volume of the figure below.

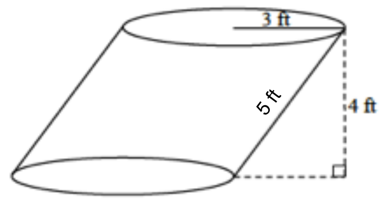


Warmup in Your Spiral: Compute the volume of the figure below.



$V = 36\pi \text{ ft}^3 \approx 113.10 \text{ ft}^3$

Warmup in Your Spiral: Compute the volume of the figure below.



$V = Bh$

$V = \pi r^2 h$

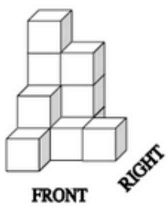
$V = \pi (3)^2 (4)$

$V = 36\pi \text{ FT}^3$

Quiz Time 2/16/17

- **Put away phone, close books, HW, *etc.***
- **You may use only your own INB & pencil.**
- **You may use only your own calculator.**
- **No sharing.**
- **Show work clearly & completely.**
- **Turn over quiz when you are finished, & either make a drawing on back of quiz or preview today's lesson.**
- **No talking until I've collected all quizzes.**
- **To request documented extension, write "more time" & room #, date & time you plan to complete.**

CL 9-112. The solid from problem CL 9−111 is redrawn below.



$V_1 = 12\ un^3$

a. If this solid were enlarged by a linear scale factor of 4, what would the volume and surface area of the new solid be?

b. Enrique enlarged the solid at right so that its volume was 1500 cubic units. What was his linear scale factor? Justify your answer.

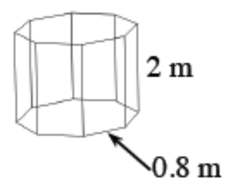
$vsf = \frac{1500}{12}$

$V_2 = 1500\ un^3$

$\sqrt[3]{r^3} = \sqrt[3]{125}$

$r = 5$

CL 9-114. A restaurant has a giant fish tank, shown at right, in the shape of an octagonal prism.



a. Find the volume and surface area of the fish tank if the base is a regular octagon with side length 0.8 m and the height of the prism is 2 m.

b. What is the density of fish if there are 208 fish in the tank?

CL 9-115. Answer the questions about the angles of polygons below, if possible. If it is not possible, explain how you know it is not possible.

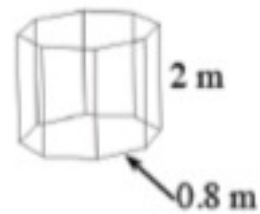
a. Find the sum of the interior angles of a 28-gon.

b. If the exterior angle of a regular polygon is 42°, how many sides does the polygon have?

c. Find the measure of each interior angle of a pentagon.

d. Find the measure of each interior angle of a regular decagon.

CL 9-114. A restaurant has a giant fish tank, shown at right, in the shape of an octagonal prism.



$n = 8$ $\theta = \frac{1}{2}(360° \div 8) = 22.5°$

a. Find the volume and surface area of the fish tank if the base is a regular octagon with side length 0.8 m and the height of the prism is 2 m.

b. What is the density of fish if there are 208 fish in the tank?

$V = Bh$

$V = 8\left(\frac{1}{2}(0.8)(0.4 \tan 67.5°)\right)(2)$

$V = 2.56 \tan 67.5° \, m^3 \approx \boxed{6.18 \, m^3}$

b. $\frac{208 \text{ FISH}}{6.18 \, m^3} \approx \boxed{33.65 \, \frac{\text{FISH}}{m^3}}$

CL 9-118. After Myong's cylindrical birthday cake was sliced, she received the slice at right. If her birthday cake originally had a diameter of 14 inches and a height of 6 inches, find the volume of her slice of cake.

$A_{sector} = \frac{38}{360}(\pi 7^2)$

$V_{piece} = 6\left(\frac{38}{360}\right)(49\pi)\ in^3$

$V = 294\pi\left(\frac{38}{360}\right) in^3$

$V \approx 97.49\ in^3$

49
6

10.1.1 What is the length of the diameter?

Introduction to Chords

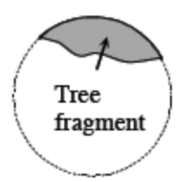
In Chapter 8, you learned that the diameter of a circle is the distance across the center of the circle. This length can be easily determined if the entire circle is in front of you and the center is marked, or if you know the length of the radius of the circle. However, what if you only have part of a circle, called an **arc**? Or what if the circle is so large that it is not practical to measure its diameter using standard measurement tools, such as finding the diameter of the Earth's equator?

Today you will consider a situation that demonstrates the need to learn more about the parts of a circle and the relationships between them.

CW: 10-1, 10-2, 10-4, 10-5

10-1. THE WORLD'S WIDEST TREE

The baobab tree is a species of tree found in Africa and Australia. It is often referred to as the world's widest tree because it has been known to be up to 45 feet in diameter!



While digging at an archeological site, Rafi found a fragment of a fossilized baobab tree that appears to be wider than any tree on record! However, since he does not have the remains of the entire tree, he cannot simply measure across the tree to find its diameter. He needs your help to determine the length of the radius of this ancient tree. Assume that the shape of the tree's cross-section is a circle.

CW: 10-1, 10-2, 10-4, 10-5

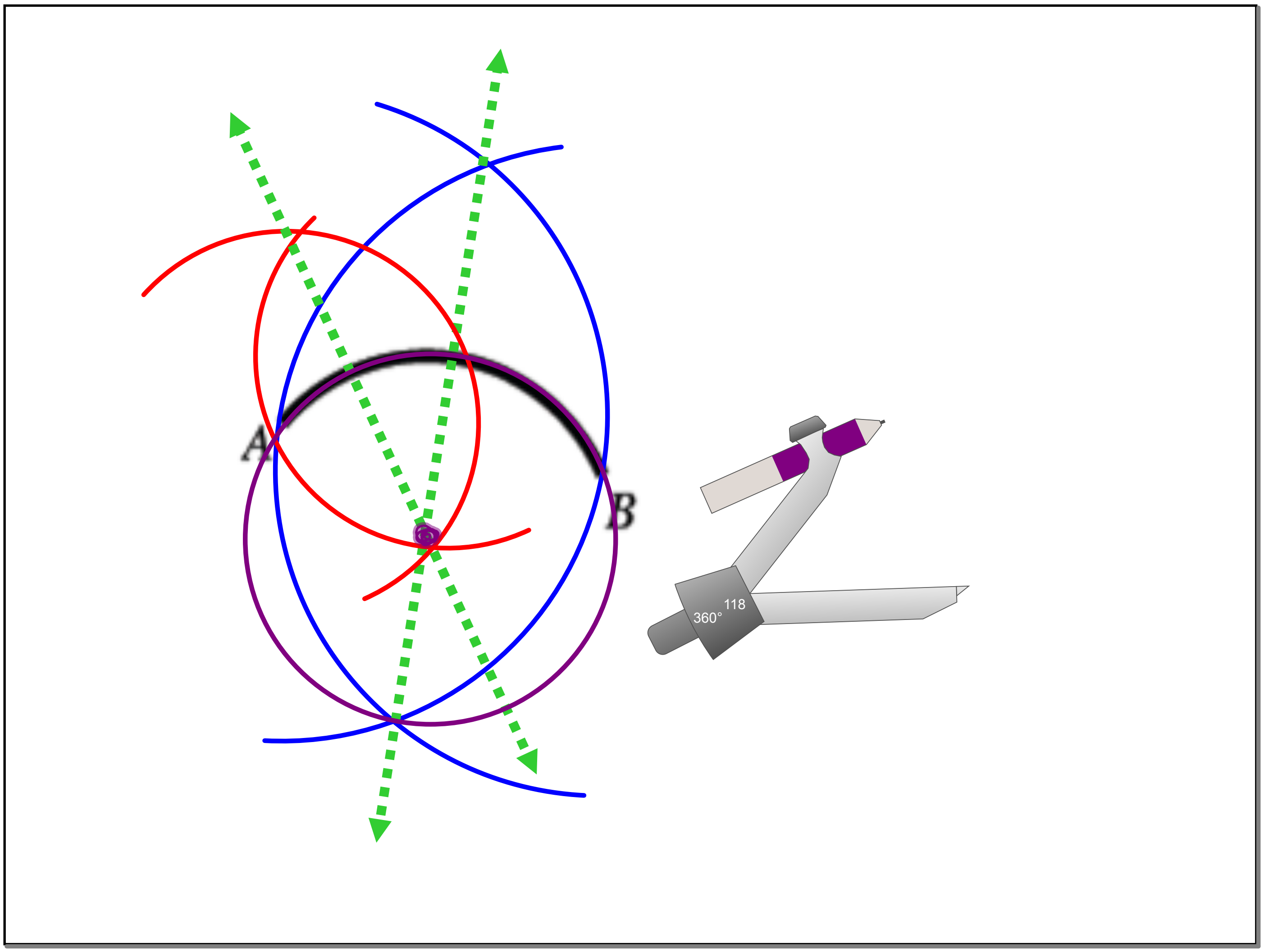
a. Obtain the Lesson 10.1.1 Resource Page from your teacher. On it, locate $\overset{\frown}{AB}$, which represents the curvature of the tree fragment. Trace this arc as neatly as possible on tracing paper. Then decide with your team how to fold the tracing paper to find the center of the tree. (Hint: This will take more than one fold.) Be ready to share with the class how you found the center.

Or, use your construction skills (& compass & straightedge).

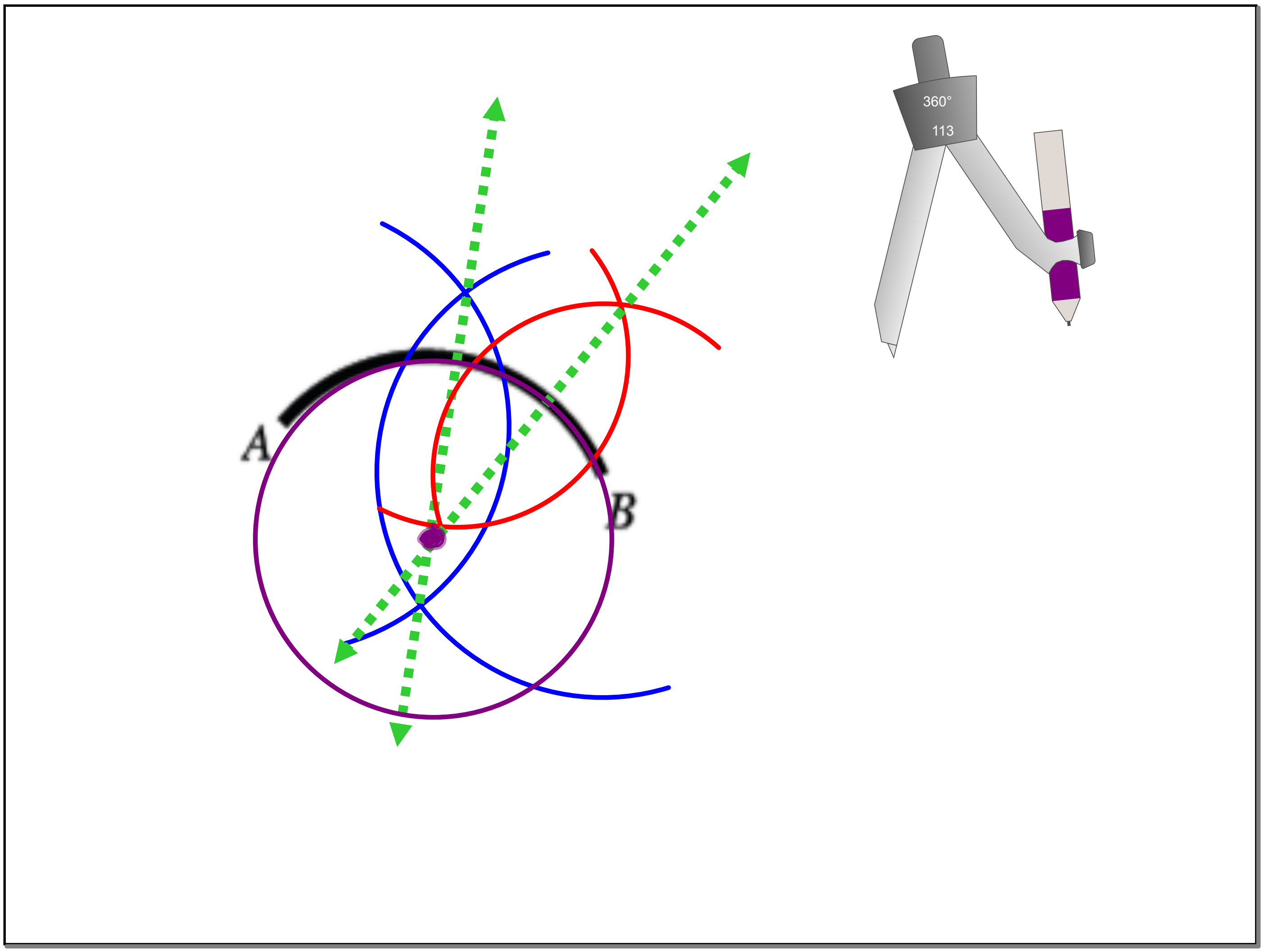
b. In part (a), you located the center of a circle. Use a ruler to measure the radius of that circle. If 1 cm represents 10 feet of tree, find the approximate length of the radius and diameter of the tree. Does the tree appear to be larger than 45 feet in diameter?


A
B

February 16, 2017

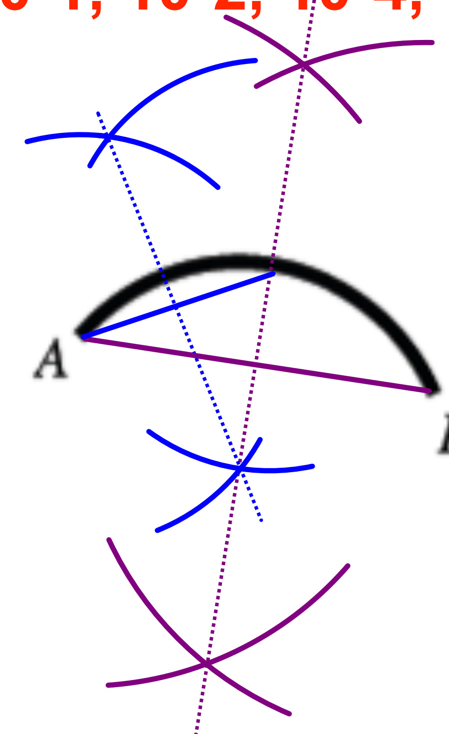


February 16, 2017



CW: 10-1, 10-2, 10-4, 10-5

a



b. $r \approx 2.5$ cm

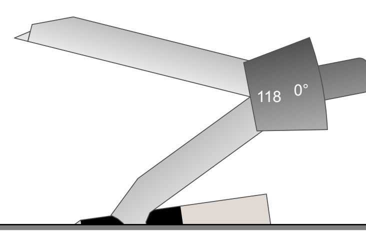
$d \approx 5$ cm

$d \approx \frac{50\text{cm}}{1} \cdot \frac{10\text{ FT}}{1\text{cm}}$

$d \approx 50$ FT

$50' \overset{?}{\geq} 45'$

✓



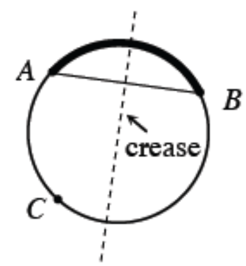
10-2. PARTS OF A CIRCLE, Part One

CW: 10-1, 10-2, 10-4, 10-5

A line segment that connects the endpoints of an arc is called a **chord**. Thus, $\overline{AB}$ in the diagram below is an example of a chord.

a. One way to find the center of a circle when given an arc is to fold it so that the two parts of the arc coincide (lie on top of each other).

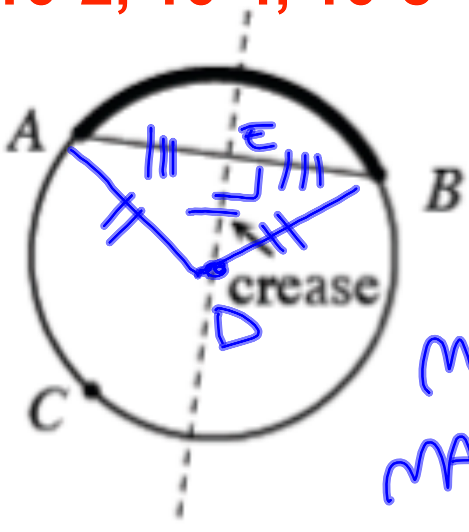
If you fold $\overset{\frown}{AB}$ so that A lies on B, what is the relationship between the resulting crease and the chord $\overline{AB}$? Explain how you know.



b. The tree fragment in problem 10-1 was an arc between points A and B. However, the missing part of the tree formed another larger arc of the tree. With your team, find the larger arc formed by the circle and points A and B above. Then propose a way to use the points to name the larger arc to distinguish it from $\overset{\frown}{AB}$.

c. In problem 10-1, the tree fragment formed the shorter arc between two endpoints. The shorter arc between points A and B is called the **minor arc** and is written $\overset{\frown}{AB}$. The larger arc is called a **major arc** and is usually written using three points, such as $\overset{\frown}{ACB}$. What do you know about $\overline{AB}$ if the minor and major arcs are the same length? Explain how you know.

CW: 10-1, 10-2, 10-4, 10-5



MINOR ARC $\overset{\frown}{AB}$

MAJOR ARC $\overset{\frown}{ACB}$

10-2. Answers **CW: 10-1, 10-2, 10-4, 10-5**

a. The crease will be a perpendicular bisector of the chord. It must pass through the center of the circle. The students can choose a point on the crease [I would choose the center of the circle] and prove that two triangles formed by the crease are congruent [by reflection]].

b. Students should note that another point on the arc (like *C*) can be used to show which side of the circle the arc lies. They will learn how to name it properly in part (c).

c. Segment *AB* must be a diameter, because it cuts the circle in half.

10-4. What if you are given two non-parallel chords in a circle and nothing else? How can you use the chords to find the center of the circle?

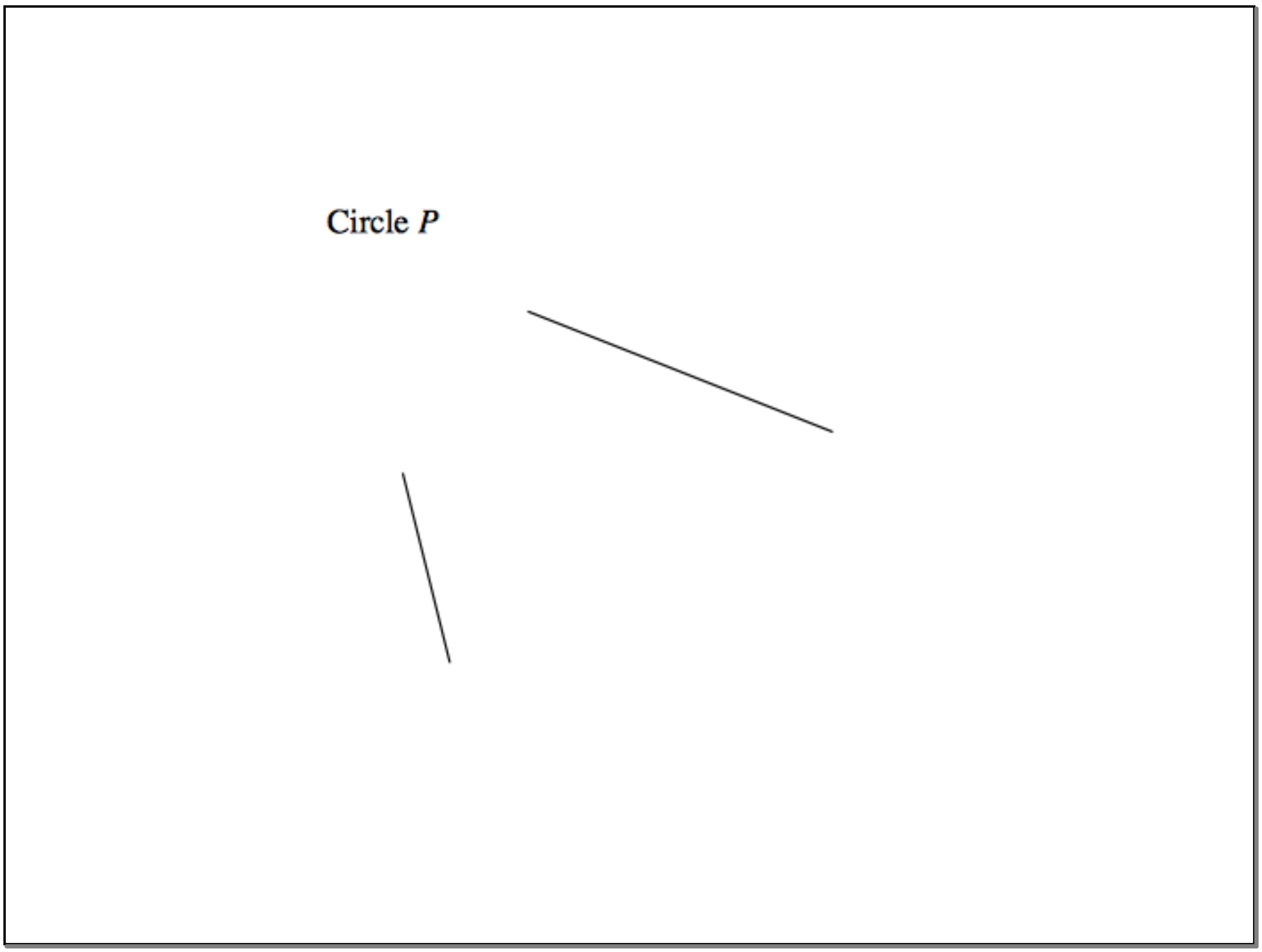
CW: 10-1, 10-2, 10-4, 10-5

a. On the Lesson 10.1.1 Resource Page, locate the chords provided for $\odot P$ and $\odot Q$. Work with your team to determine how to find the center of each circle. Then use a compass to draw the circles that contain the given chords. Tracing paper may be helpful.

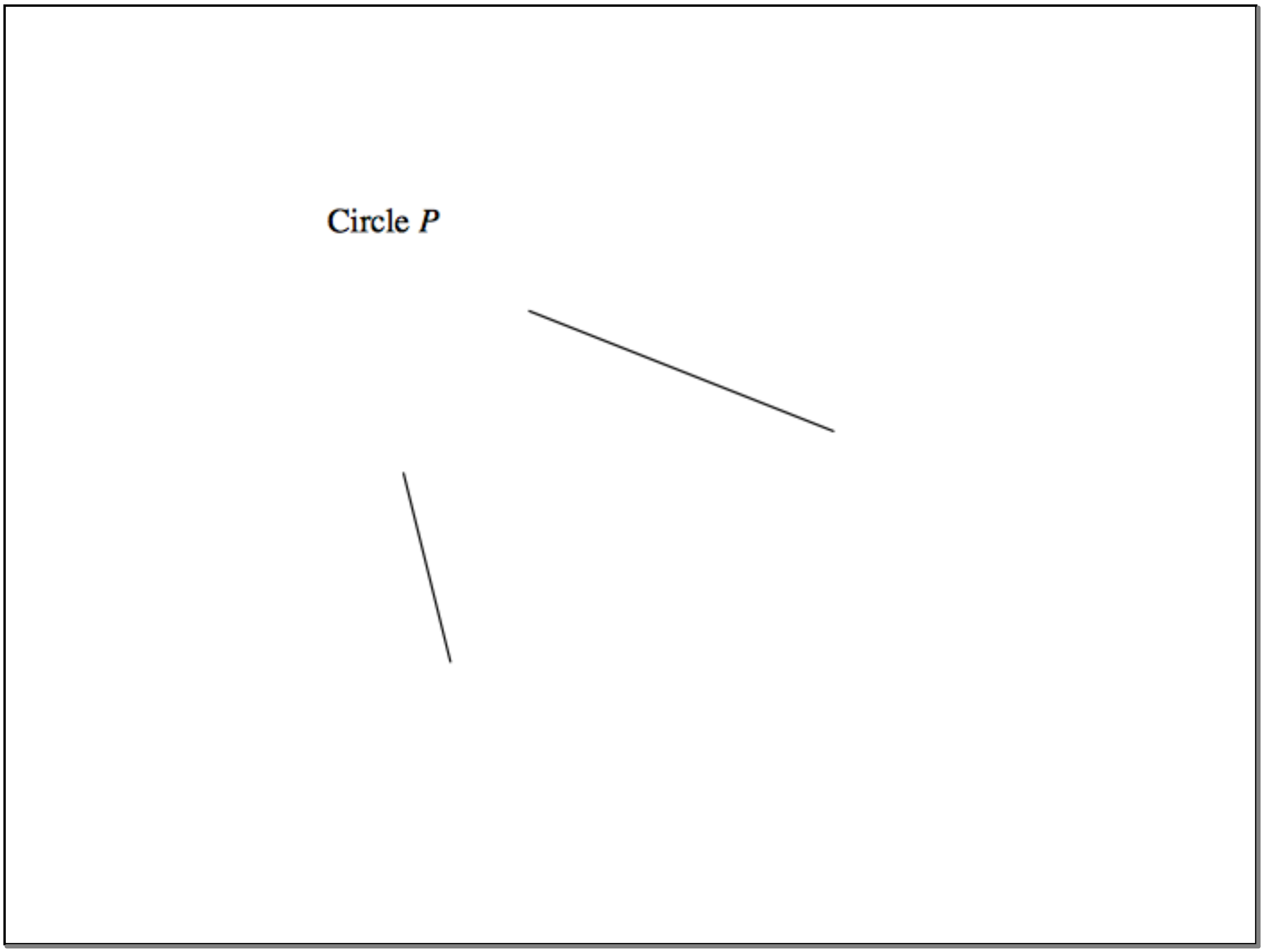
b. Describe how to find the center of a circle without tracing paper. That is, how would you find the center of $\odot P$ with only a compass and a straightedge? Be prepared to share your description with the rest of the class.

Point of intersection of perpendicular bisectors of nonparallel chords will be center of circle.

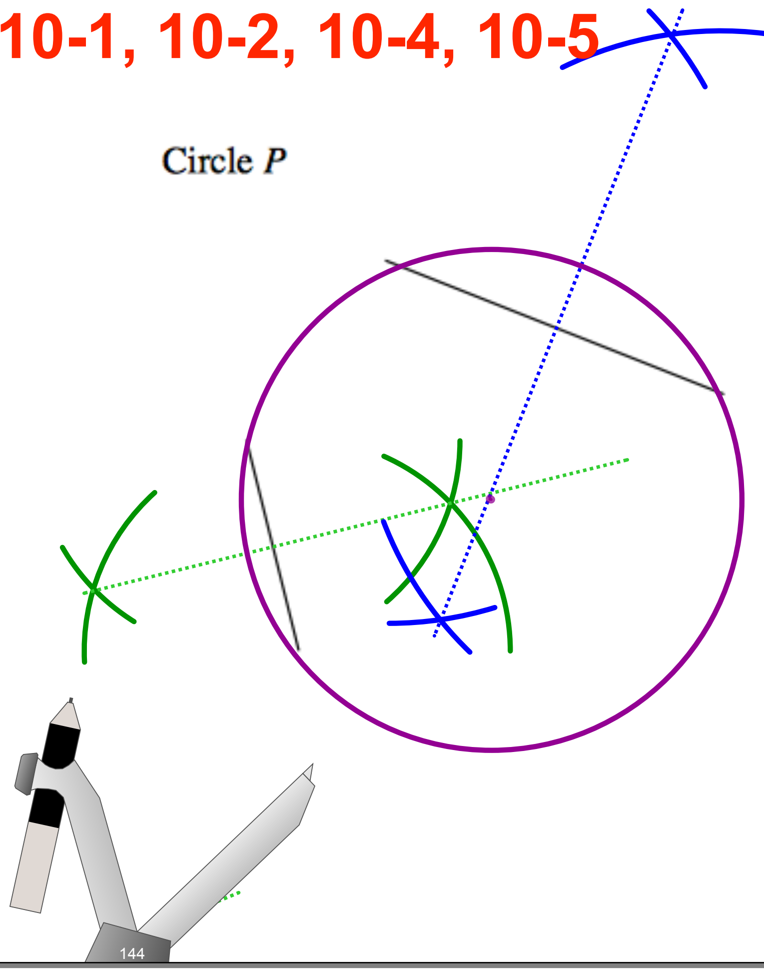
February 16, 2017



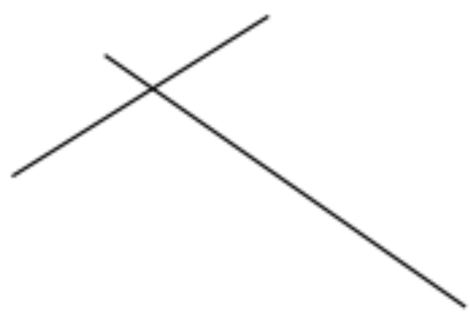
February 16, 2017



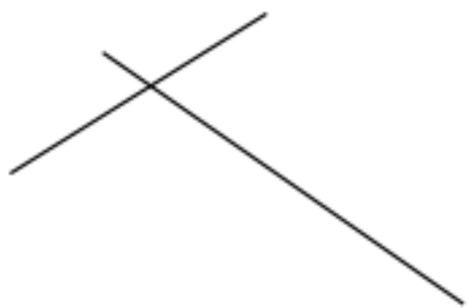
CW: 10-1, 10-2, 10-4, 10-5



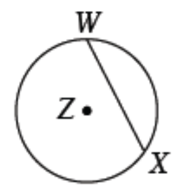
Circle Q



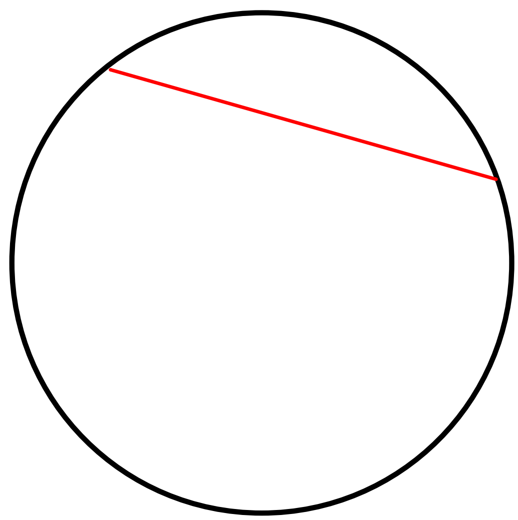
Circle Q



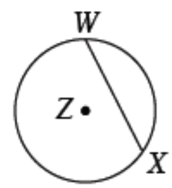
10-5. Examine the chord $\overline{WX}$ in $\odot Z$ at right. If $WX = 8$ units and the length of the radius of $\odot Z$ is 5 units, how far from the center is the chord? Draw the diagram on your paper and show all work.



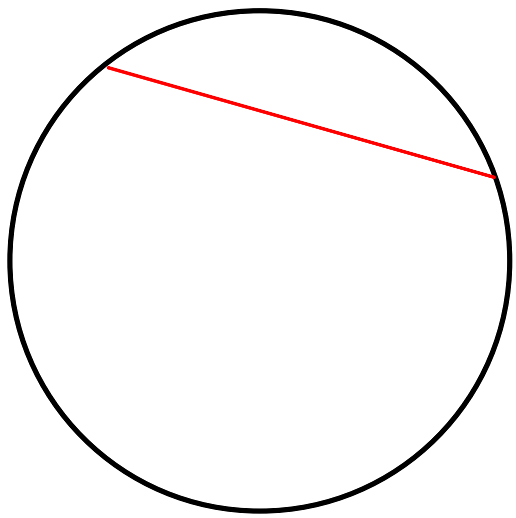
CW: 10-1, 10-2, 10-4, 10-5



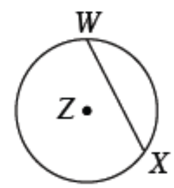
10-5. Examine the chord $\overline{WX}$ in $\odot Z$ at right. If $WX = 8$ units and the length of the radius of $\odot Z$ is 5 units, how far from the center is the chord? Draw the diagram on your paper and show all work.



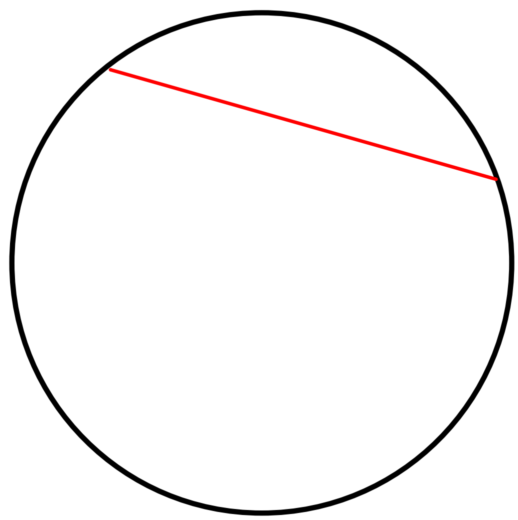
CW: 10-1, 10-2, 10-4, 10-5



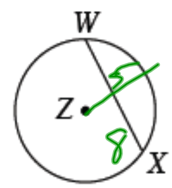
10-5. Examine the chord $\overline{WX}$ in $\odot Z$ at right. If $WX = 8$ units and the length of the radius of $\odot Z$ is 5 units, how far from the center is the chord? Draw the diagram on your paper and show all work.



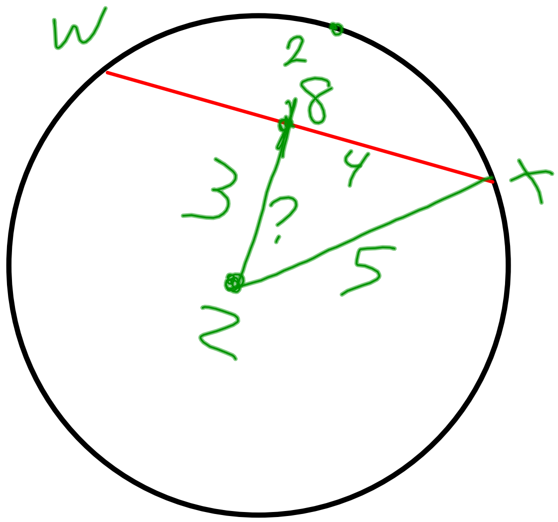
CW: 10-1, 10-2, 10-4, 10-5



10-5. Examine the chord $\overline{WX}$ in $\odot Z$ at right. If $WX = 8$ units and the length of the radius of $\odot Z$ is 5 units, how far from the center is the chord? Draw the diagram on your paper and show all work.



CW: 10-1, 10-2, 10-4, 10-5



METHODS AND MEANINGS INB 80

MATH NOTES

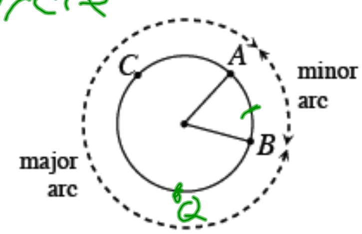
CPM 583

Circle Vocabulary

An **arc** is a part of a circle. Remember that a circle does not contain its interior. A bicycle tire is an example of a circle. The spokes and the space in between them are not part of the circle. The piece of tire between any two spokes of the bicycle wheel is an example of an arc.

Semicircle

Any two points on a circle create two arcs. When these arcs are not the same length, the larger arc is referred to as the **major arc**, while the smaller arc is referred to as the **minor arc**.



$\overset{\frown}{AB}$

$\overset{\frown}{ACB}$

To name an arc, an arc symbol is drawn over the endpoints, such as $\overset{\frown}{AB}$. To refer to a major arc, a third point on the arc should be used to identify the arc clearly, such as $\overset{\frown}{ACB}$.

A **chord** is a line segment that has both endpoints on a circle. $\overline{AB}$ in the diagram at right is an example of a chord. When a chord passes through the center of the circle, it is called a **diameter**.

$\overline{AB}$

HW:

- **10-6 to 10-12;**
- **MN: Circle Vocabulary (CPM 583/INB 80);**
- **Portfolio due Tuesday;**
- **Ch 9 Quiz 2/24**

HW✓: 10-6 to 10-12

10-6 **a.** $V = (2)(5)(6) - \pi(0.5^2)(6) \approx 55.3\text{cm}^3$
b. Answers vary. One possibility: It could represent a pencil sharpener.

10-7 **a.** 70° **b.** 50° **c.** $2x$

10-8 She is constructing an angle bisector.

10-9 height = $6\sqrt{3}$
area = $(15)(6\sqrt{3}) + \frac{1}{6}(144\pi) = (90\sqrt{3} + 24\pi)\text{ in}^2 \approx 231.3\text{ in}^2$
perimeter = $15 + 12 + 12 + 15 + \frac{1}{6}(24\pi) = (54 + 4\pi)\text{ in.} \approx 66.6\text{ in.}$

10-10 **a.** $17, {}^-17, 17, {}^-17, 17$ geometric
b. $32, 11, \frac{1}{2}, {}^-4\frac{3}{4}, {}^-7\frac{3}{8}$ neither
c. $81, 81, 81, 81, 81$ arithmetic and geometric

10-11 They intersect only once at (3, 5)

10-12 D