# Starter

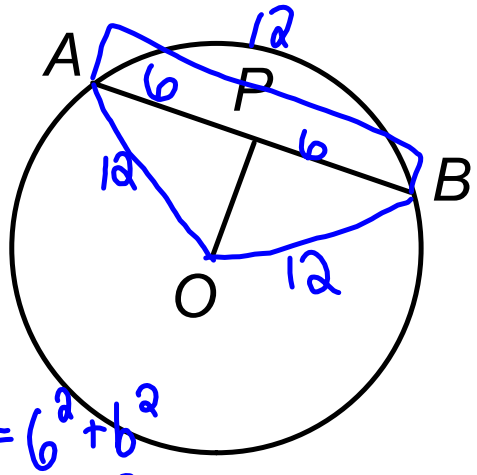
Given: Circle O

r = 12

AB = 12

OP ⊥ AB

Find: OP




$12^2 = 6^2 + b^2$

$144 = 36 + b^2$

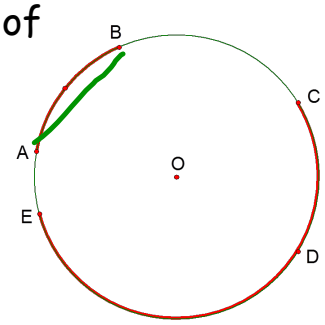
$108 = b^2$

$10.39 = b$ or $6\sqrt{3}$

# The Circle and their Arcs

## ARC

- An arc consists of two points on a circle and all of the points on the circle needed to connect the points by a single path




## Center of an ARC

- The center of an arc is the center of the circle of which the arc is a part.

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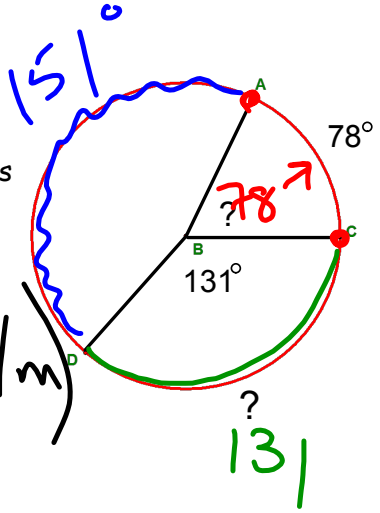
## Central Angle

A central angle is an angle whose vertex is at the center of a circle.

The measure of a central angle is equal to the measure of it's intercepted arc!



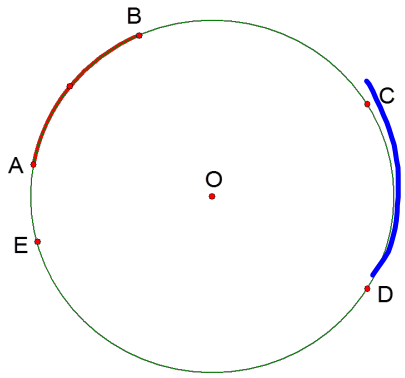

Note: the measure of a central angle is less than 180 degrees

measure → degrees

length → distance (ft/in/m)

## Minor ARC

- The measure of a minor arc is always less than 180 degrees




A minor arc is named with its endpoints.

(2 letters)

The measure of the minor arc is indicated by $m\overset{\frown}{AB}$

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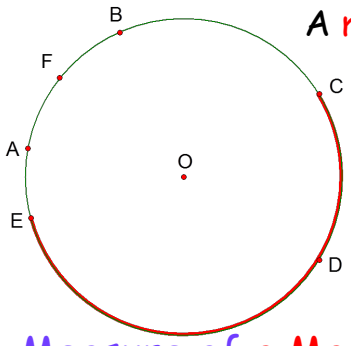
## Major ARC

- The measure of a major arc is always greater than 180 degrees




A major arc must be named with three points on the circle!

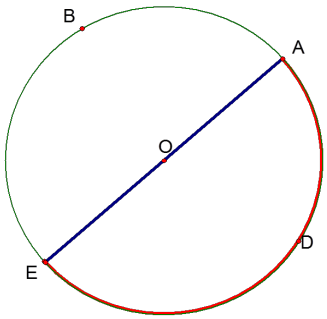
## Measure of a Major ARC

- The measure of a major arc is equal to the 360 minus the measure of the minor arc with the same endpoints.

The measure of the major arc is indicated by $m\overset{\frown}{EDC}$

## Semicircle

- A semicircle is an arc whose endpoints are on the diameter of a circle
- The measure of a semicircle is always equal to 180 degrees




A semicircle must be named with three points on the circle!

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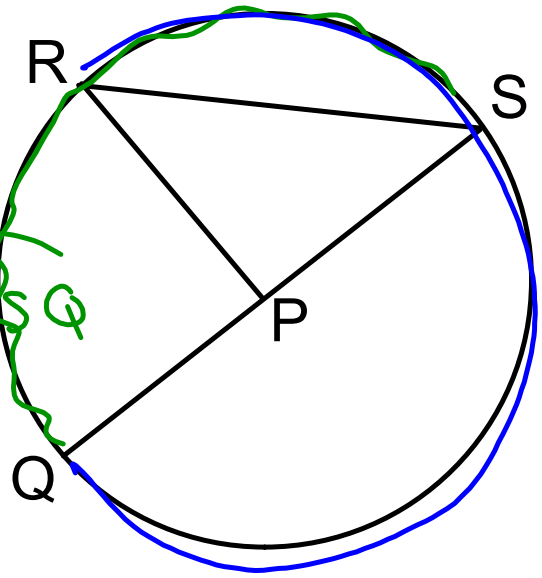
Name each of the following:
(include correct notation!)

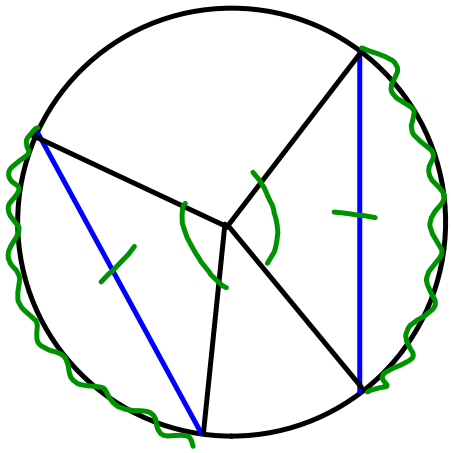
1. Radius $\overline{RP}$
2. Diameter $\overline{QS}$
3. Chord $\overline{RS}$
4. Minor arc $\overset{\frown}{RS}$
5. Major arc $\overset{\frown}{RSQ}$
6. Semicircle $\overset{\frown}{SRQ}$
7. Central angle $\angle RPS$



# Theorems

- In the same or congruent circles…

≅ chords ⇔ ≅ arcs ⇔ ≅ central angles



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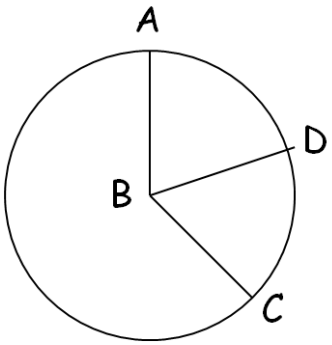
# Example 1

Given: Circle B

D is the midpt of arc AC

Conclusion: $\overrightarrow{BD}$ bisects $\angle ABC$




| Statements | Reasons |
|---|---|
| 1. Circle B | 1. Given |
| 2. D is the midpt of arc AC | 2. Given |
| 3. $\overset{\frown}{AB} \cong \overset{\frown}{CD}$ | 3. The midpt of an arc divides the arc into two ≅ arcs |
| 4. $\angle ABD \cong \angle DBC$ | 4. ≅ arcs → ≅ central angles |
| 5. $\overrightarrow{BD}$ bisects $\angle ABC$ | 5. Def of ∠ bisector |

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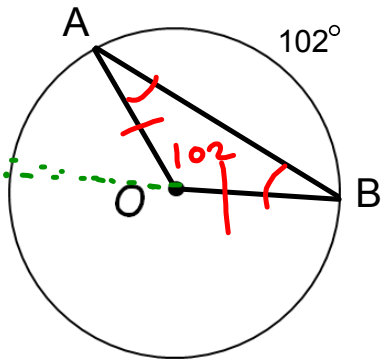
# Example 2

If $m\overset{\frown}{AB} = 102^\circ$ in Circle O,
find $m\angle A$ and $m\angle B$ in $\Delta AOB$




$\angle A \cong \angle B$

$180 - 102 = 78 \div 2 = 39$

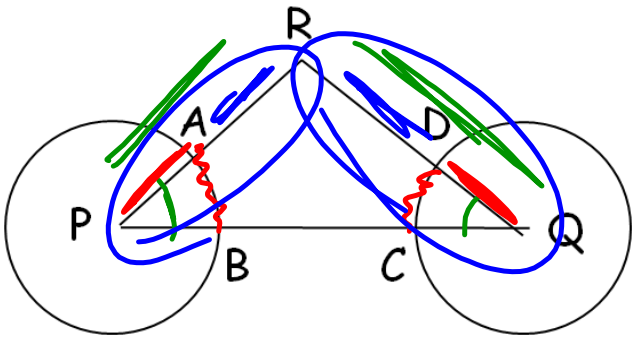
$\angle A = 39^\circ = \angle B$

# Example 3

**Given:** Circle P ≅ Circle Q

$\overline{AR} \cong \overline{RD}$

**Prove:** $\overset{\frown}{AB} \cong \overset{\frown}{CD}$




| Statements | Reasons |
|---|---|
| 1) Circle P ≅ Circle Q | 1) Given |
| 2) AR ≅ RD | 2) Given |
| 3) AP ≅ QD | 3) ≅ circles ⟹ ≅ radii |
| 4) RP ≅ RQ | 4) Addition |
| 5) ∠P ≅ ∠Q | 5) If △ , then △ |
| 6) $\overset{\frown}{AB} \cong \overset{\frown}{CD}$ | 6) ≅ central angles ⟹ ≅ arcs |

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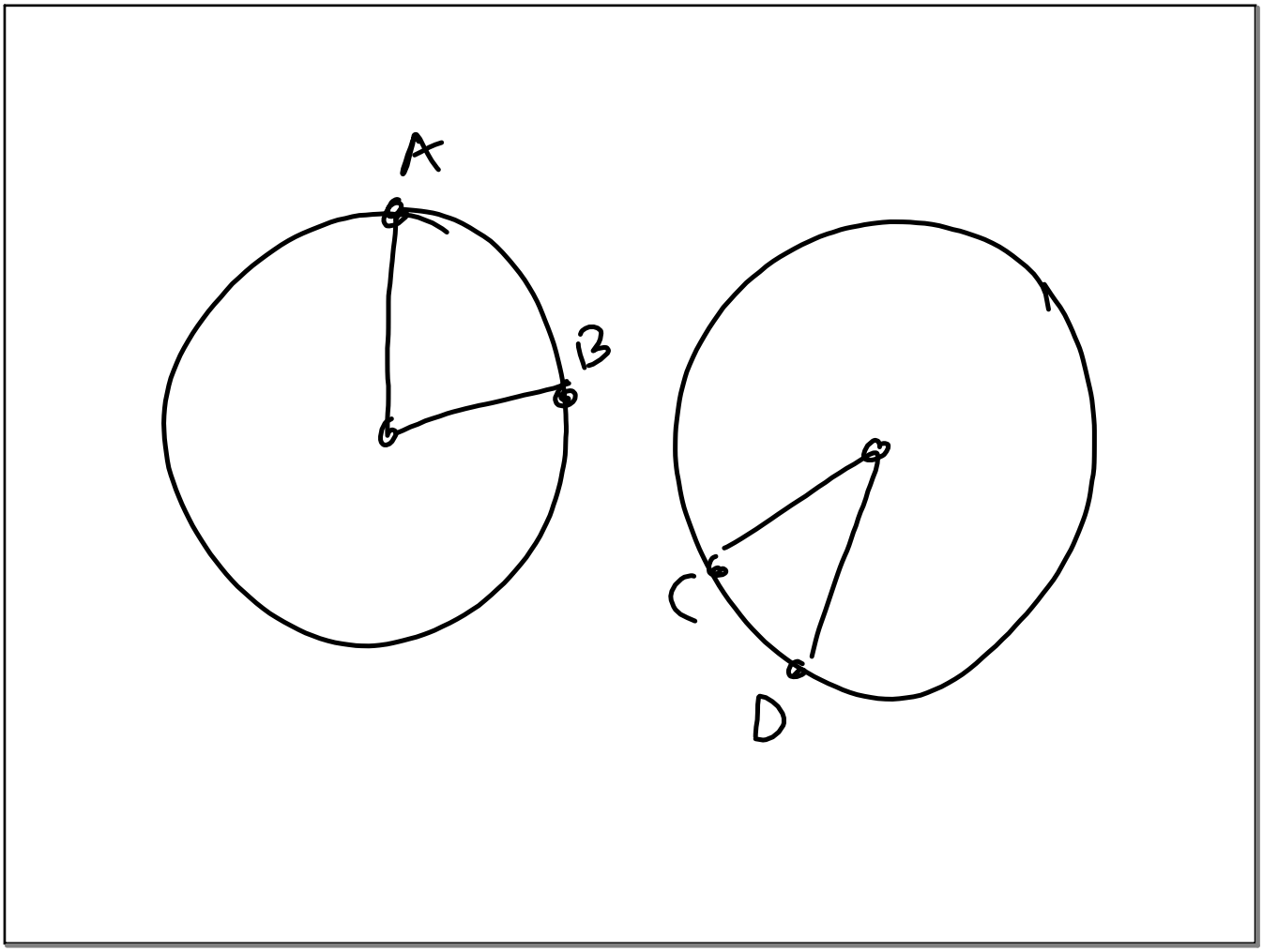


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# Example 4

- A) What fractional part of a circle is an arc of 36°?

  36/360 = 1/10

  - Of 200°?

    200/360 = 5/9

- B) Find the measure of an arc that is 7/12 of its circle.

  7/12 (360) = 210°

  360° / 12 · 7

# Homework

p. 455 ~~#3, 4, 6 - 11, 13, 15, 17~~

3, 4, 6, 9 - 11, 13, 19

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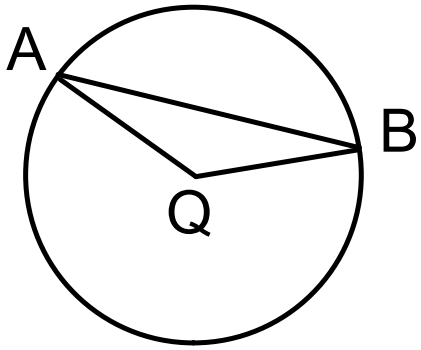
# EXIT SLIP

Given: Circle Q

$\angle A = 25°$

Find: m $\overset{\frown}{AB}$

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