

## Zero The Math Hero Standard Mathematical Elements - Lesson 9

Lesson 9 defines the term circle. The parts of a circle are also defined. Some key parts that are discussed:

- diameter
- radius
- arc (minor, major, semicircle)
- central angle
- chord
- tangent
- secant

Lesson 9 also models how to find angle measures for central angles and arcs. In this lesson, diameter and radius lengths are also found. The distance formula is used in this lesson to find the length of a radius on a graph, and the midpoint formula is reviewed in order to find the coordinates of the center of a circle on a graph. Perpendicular bisectors are also used in this lesson to find the center of a circle.

## Zero the Math Hero – Lesson 9

### Lesson 9 – Definitions

**center** - for a circle, the point equidistant from all points on the circle

**circle** - a set of coplanar points the same distance from a center point

Symbol -  $\odot C$  (name for circle C)

**compass** - a device used to draw circles and arcs

**diameter** - a segment that joins two points on a circle that passes through the center

**radius** - a segment that joins a point on the circle with the center point

**arc** - a part of a circle

Symbol -  $\widehat{AB}$  (name for minor arc AB)

**central angle** - an angle in a circle whose vertex is the center

**chord** - a segment that joins two points on a circle

**parallel** - lines that are coplanar and do not intersect

Symbol -  $\parallel$  (read “is parallel to”)

**perpendicular** - lines that intersect to form a right angle

Symbol -  $\perp$  (read “is perpendicular to”)

**tangent** - a line that is coplanar with a circle and touches the circle at only one point

**secant** - a line that touches a circle at two different points

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Lesson 9 - Practice Problems

Circles - Applications

1. - 8. Identify the parts of  $\odot T$ .

1.  $\overline{RV}$  \_\_\_\_\_

2.  $\overline{TS}$  \_\_\_\_\_

3.  $\overline{RQ}$  \_\_\_\_\_

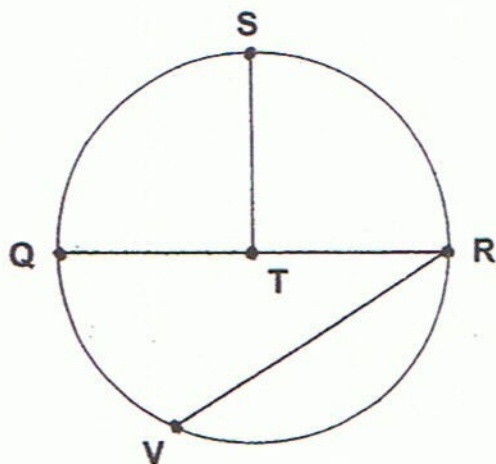
4.  $\widehat{RV}$  \_\_\_\_\_

5.  $\widehat{RSQ}$  \_\_\_\_\_

6.  $\widehat{RVS}$  \_\_\_\_\_

7.  $\angle RTS$  \_\_\_\_\_

8.  $\overline{TQ}$  \_\_\_\_\_

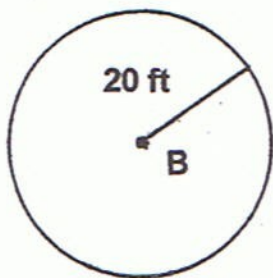


9. The total number of degrees in a circle is 2.

- A.  $180^\circ$    B.  $90^\circ$    C.  $360^\circ$    D.  $720^\circ$

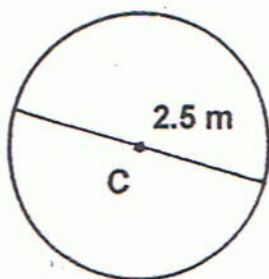
9. \_\_\_\_\_

10. Find the length of the diameter for  $\odot B$ .



10. \_\_\_\_\_

11. Find the length of the radius for  $\odot C$ .



11. \_\_\_\_\_

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Lesson 9 - Practice Problems - Continued

Circles - Applications

12. What is the length of the diameter of a circle if it has a radius length of 12 m? 12. \_\_\_\_\_

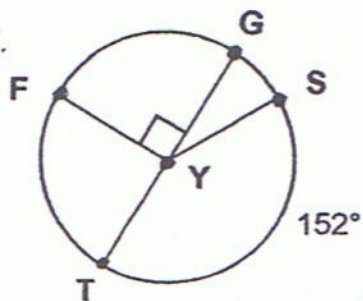
13. What is the length of the radius of a circle if it has a diameter length of 7.5 cm? 13. \_\_\_\_\_

14. Find the following arc measures for  $\odot Y$ .

A.  $m\widehat{GF}$  \_\_\_\_\_

B.  $m\widehat{GFT}$  \_\_\_\_\_

C.  $m\widehat{GTS}$  \_\_\_\_\_

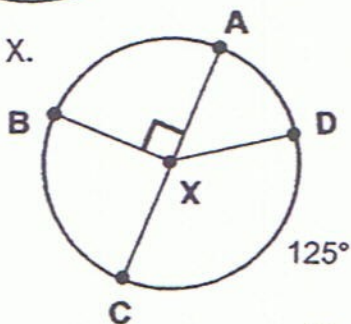


15. Find the following central angle measures for  $\odot X$ .

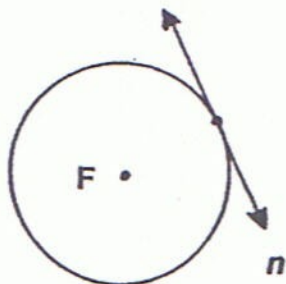
A.  $m\angle BXC$  \_\_\_\_\_

B.  $m\angle DXA$  \_\_\_\_\_

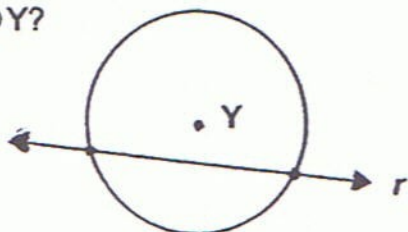
C.  $m\angle BXD$  \_\_\_\_\_



16. What type of line is  $n$  for  $\odot F$ ? 16. \_\_\_\_\_



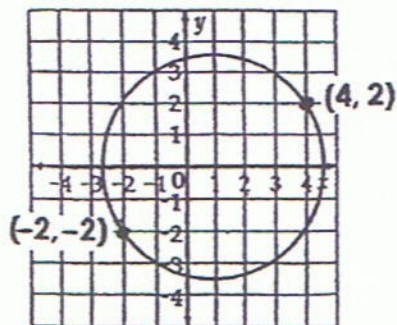
17. What type of line is  $r$  for  $\odot Y$ ? 17. \_\_\_\_\_



18. Find the coordinates of the center of this circle. Then find the length of a radius for the circle.

center: \_\_\_\_\_

radius: \_\_\_\_\_



Name: \_\_\_\_\_

Date: \_\_\_\_\_

**Quiz – Definitions**  
**Zero the Math Hero – Lesson 9**

**Directions:** Fill in each blank with the letter that corresponds to the correct answer, A-L.

- |  |                  |
|--|------------------|
| 1. _____ a segment that joins two points on a circle                                     | A. center        |
| 2. _____ a segment that joins two points on a circle that passes through the center      | B. circle        |
| 3. _____ for a circle, the point equidistant from all points on the circle               | C. compass       |
| 4. _____ a line that touches a circle at two different points                            | D. diameter      |
| 5. _____ lines that are coplanar and do not intersect                                    | E. radius        |
| 6. _____ a set of coplanar points the same distance from a center point                  | F. arc           |
| 7. _____ an angle in a circle whose vertex is the center                                 | G. central angle |
| 8. _____ a device used to draw circles and arcs  | H. chord         |
| 9. _____ a part of a circle  | I. parallel      |
| 10. _____ a segment that joins a point on the circle with the center point               | J. perpendicular |
| 11. _____ a line that is coplanar with a circle and touches the circle at only one point | K. tangent       |
| 12. _____ lines that intersect to form a right angle                                     | L. secant        |

Name: ANSWER KEY

Date: \_\_\_\_\_

**Lesson 9 - Practice Problems**  
Circles - Applications

1. - 8. Identify the parts of  $\odot T$ .

1.  $\overline{RV}$  chord

2.  $\overline{TS}$  radius

3.  $\overline{RQ}$  diameter

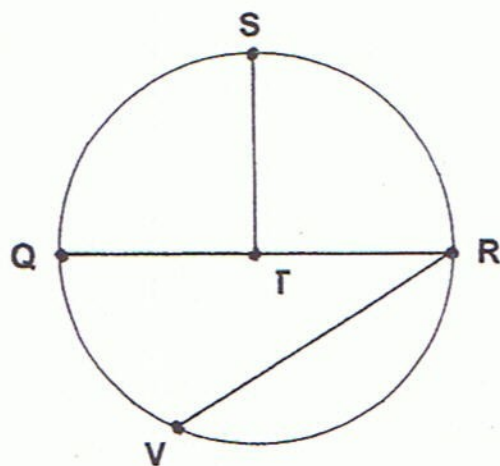
4.  $\widehat{RV}$  minor arc

5.  $\widehat{RSQ}$  semicircle

6.  $\widehat{RVS}$  major arc

7.  $\angle RTS$  central angle

8.  $\overline{TQ}$  radius

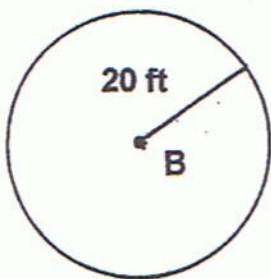


9. The total number of degrees in a circle is 2.

- A.  $180^\circ$    B.  $90^\circ$    C.  $360^\circ$    D.  $720^\circ$

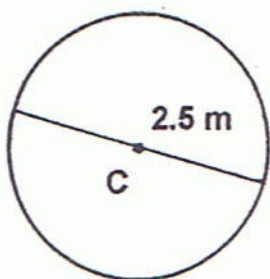
9. C ( $360^\circ$ )

10. Find the length of the diameter for  $\odot B$ .



10. 40 ft

11. Find the length of the radius for  $\odot C$ .



11. 1.25 m

### Lesson 9 - Practice Problems - Continued

Circles - Applications

12. What is the length of the diameter of a circle if it has a radius length of 12 m?

12. 24 m

13. What is the length of the radius of a circle if it has a diameter length of 7.5 cm?

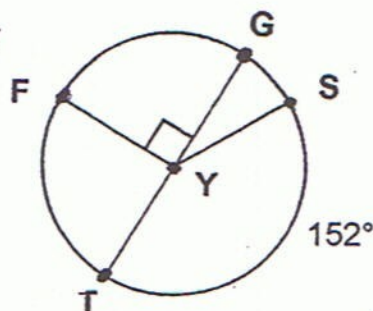
13. 3.75 cm

14. Find the following arc measures for  $\odot Y$

A.  $m\widehat{GF}$   $90^\circ$

B.  $m\widehat{GFT}$   $180^\circ$

C.  $m\widehat{GTS}$   $332^\circ$

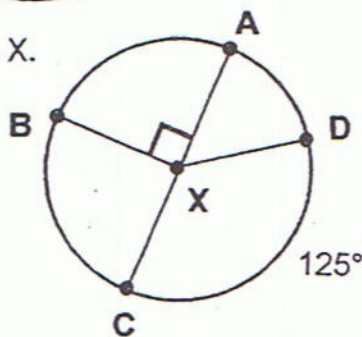


15. Find the following central angle measures for  $\odot X$ .

A.  $m\angle BXC$   $90^\circ$

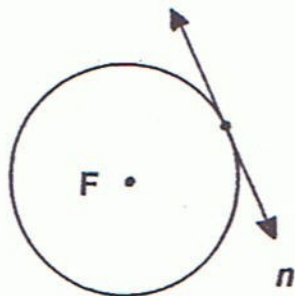
B.  $m\angle DXA$   $55^\circ$

C.  $m\angle BXD$   $145^\circ$



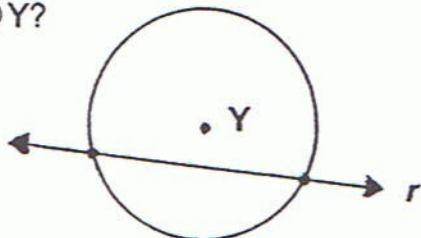
16. What type of line is  $n$  for  $\odot F$ ?

16. tangent



17. What type of line is  $r$  for  $\odot Y$ ?

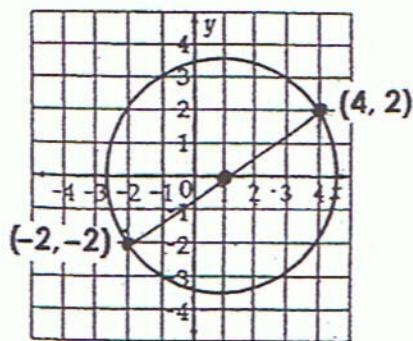
17. secant



18. Find the coordinates of the center of this circle. Then find the length of a radius for the circle.

center:  $(1, 0)$

radius:  $\sqrt{13}$  ( $\approx 3.6$ )



Name: ANSWER KEY

Date: \_\_\_\_\_

**Quiz – Definitions**  
Zero the Math Hero – Lesson 9

Directions: Fill in each blank with the letter that corresponds to the correct answer, A-L.

1. H a segment that joins two points on a circle. A. center
2. D a segment that joins two points on a circle that passes through the center. B. circle
3. A for a circle, the point equidistant from all points on the circle. C. compass
4. L a line that touches a circle at two different points. D. diameter
5. I lines that are coplanar and do not intersect. E. radius
6. B a set of coplanar points the same distance from a center point. F. arc
7. G an angle in a circle whose vertex is the center. G. central angle
8. C a device used to draw circles and arcs. H. chord
9. F a part of a circle. I. parallel
10. E a segment that joins a point on the circle with the center point. J. perpendicular
11. K a line that is coplanar with a circle and touches the circle at only one point. K. tangent
12. J lines that intersect to form a right angle. L. secant