**7.3 Inscribed vs. Central Angles; Arc Measure vs. Arc Length**

(Adapted from MVP RSG 7.3: https://www.mathematicsvisionproject.org/uploads/1/1/6/3/11636986/m2_mod7_se_52017f.pdf)

**Topic: Trigonometric Ratios**

Solve each right triangle below by finding the value of the missing sides and angles (correct to the nearest tenth).

1. \[ \triangle ABC \]
   - \( a = \_\_\_\_ \)
   - \( b = \_\_\_\_ \)
   - \( \angle A = \_\_\_\_ \)

2. \[ \triangle ABC \]
   - \( a = \_\_\_\_ \)
   - \( c = \_\_\_\_ \)
   - \( \angle A = \_\_\_\_ \)

3. \[ \triangle ABC \]
   - \( a = \_\_\_\_ \)
   - \( b = \_\_\_\_ \)
   - \( \angle A = \_\_\_\_ \)

4. \[ \triangle ABC \]
   - \( a = \_\_\_\_ \)
   - \( \angle A = \_\_\_\_ \)
   - \( \angle B = \_\_\_\_ \)

**Topic: Minor and Major Arc and Semicircles**

In \( \odot S \), \( \overline{TE} \) and \( \overline{KR} \) are diameters with \( \angle TSR = 42^\circ \). Determine whether each arc is a minor arc, a major arc, or a semicircle. Then, find the degree measure of the arc indicated.

5. \( \overparen{TR} \)
   - \( \angle TKS = \_\_\_\_^\circ \)

6. \( \overparen{TR} \)
   - \( \angle TKR = \_\_\_\_^\circ \)

7. \( \overparen{TR} \)
   - \( \angle TRK = \_\_\_\_^\circ \)

8. \( \overparen{KE} \)
   - \( \angle KER = \_\_\_\_^\circ \)

**Topic: Inscribed and Central Angles**

Refer to \( \odot E \) for the following problems. If \( \angle TEG = 21^\circ \) and \( \overline{TR} \) is a diameter, determine whether each arc is a minor arc, a major arc, or a semicircle. Then, find the degree measure of each arc indicated.

9. \( \overparen{TG} \)
   - \( \angle TAG = \_\_\_\_^\circ \)

10. \( \overparen{ATR} \)
    - \( \angle TAR = \_\_\_\_^\circ \)

11. \( \overparen{AR} \)
    - \( \angle ARG = \_\_\_\_^\circ \)

12. \( \overparen{TAR} \)
    - \( \angle TAR = \_\_\_\_^\circ \)

13. \( \overparen{ATG} \)
    - \( \angle ARG = \_\_\_\_^\circ \)

14. \( \overparen{AR} \)
    - \( \angle ARG = \_\_\_\_^\circ \)

15. \( \overparen{RAR} \)
    - \( \angle RAG = \_\_\_\_^\circ \)

16. \( \overparen{TAG} \)
    - \( \angle TAG = \_\_\_\_^\circ \)

17. \( \overparen{G} \)
   - \( \angle GAR = \_\_\_\_^\circ \)

In the circle to the right, \( \angle AD = 124^\circ \), \( \angle BE = 48^\circ \), and \( \angle DE = 72^\circ \). Find each angle measure indicated.

18. \( \angle DBA \)
   - \( \angle DBA = \_\_\_\_^\circ \)

19. \( \angle BAE \)
   - \( \angle BAE = \_\_\_\_^\circ \)

20. \( \angle ADE \)
   - \( \angle ADE = \_\_\_\_^\circ \)
Find the value of the angle or the intercepted arc indicated in the figure below. If necessary, round all answers to the nearest tenth. \((\text{NOTE: Circles may not be drawn to scale})\).

21. \(\bigcirc M\) with \(m\angle LMN=110^\circ\)

   - \(m\angle L\overline{N} = \) 
   - \(m\angle O\overline{LN} = \) 
   - \(m\overline{OL} = \)

22. \(\bigcirc B\) with \(m\angle ABC=130^\circ\)

   - \(m\overline{AC} = \) 
   - \(m\angle CAD = \) 
   - \(m\overline{DA} = \)

23. \(\bigcirc F\)

   - \(m\overline{EG} = \) 
   - \(m\angle E\overline{HG} = \) 
   - \(m\angle G\overline{EH} = \) 
   - \(m\angle G\overline{FH} = \)

24. \(\bigcirc M\) with diameter \(\overline{NK}\)

   \(\overline{NL}=12\) and \(\overline{KL}=5\)

   - \(NK = \) 
   - \(m\angle N\overline{LK} = \) 
   - \(m\overline{NJ}\overline{K} = \) 
   - \(m\angle N\overline{LK} = \) 
   - \(m\overline{KL} = \) 
   - \(m\overline{NL} = \)

25. How can a triangle be used to show the connection between an inscribed angle and the angle measure of the arc it intercepts? \((\text{HINT: Think about what is true about the angle measure in any triangle and what is true about the arc measure for an entire circle})\).

**Topic:** Arc Length

Find the length of the arc indicated below. Leave your answer as a fraction in simplest form.

26. \(\overline{AB} = \) 

   \(\bigcirc\) with \(12\text{ mm}\) at \(45^\circ\) from \(A\) to \(B\)

27. \(\overline{CAB} = \) 

   \(\bigcirc\) with \(8\text{ cm}\) at \(120^\circ\) from \(A\) to \(B\)