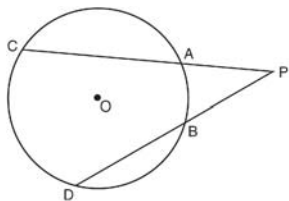


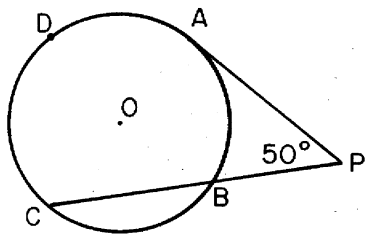
G.G.51: Arcs Determined by Angles 4: Investigate theorems about the arcs determined by angles intersecting a circle when the vertex is outside the circle

- 1 In the diagram below of circle O , \overline{PAC} and \overline{PBD} are secants.



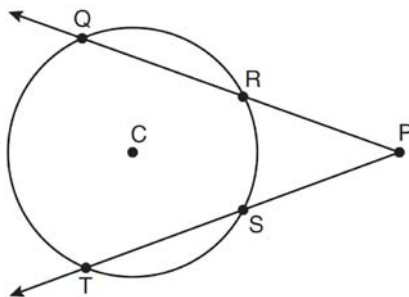
If $m\widehat{CD} = 70$ and $m\widehat{AB} = 20$, what is the degree measure of $\angle P$?

- 1) 25
 - 2) 35
 - 3) 45
 - 4) 50
- 2 In the accompanying diagram, tangent \overline{PA} and secant \overline{PBC} are drawn to circle O . If $m\widehat{ADC}$ is twice $m\widehat{AB}$ and $m\angle P$ is 50, what is $m\widehat{AB}$?



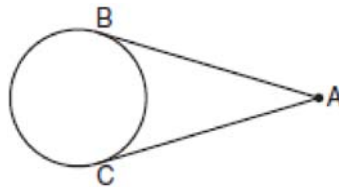
- 1) 25
- 2) 50
- 3) 100
- 4) 200

- 3 In the diagram below of circle C , $m\widehat{QT} = 140$, and $m\angle P = 40$.



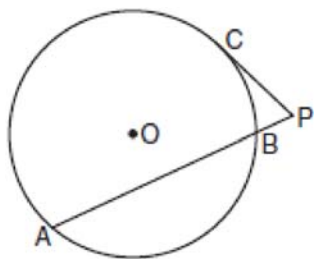
What is $m\widehat{RS}$?

- 1) 50
 - 2) 60
 - 3) 90
 - 4) 110
- 4 In circle O , \overline{PA} and \overline{PB} are tangent to the circle from point P . If the ratio of the measure of major arc AB to the measure of minor arc AB is 5:1, then $m\angle P$ is
- 1) 60
 - 2) 90
 - 3) 120
 - 4) 180
- 5 The accompanying diagram shows two lengths of wire attached to a wheel, so that \overline{AB} and \overline{AC} are tangent to the wheel. If the major arc \widehat{BC} has a measure of 220° , find the number of degrees in $m\angle A$.

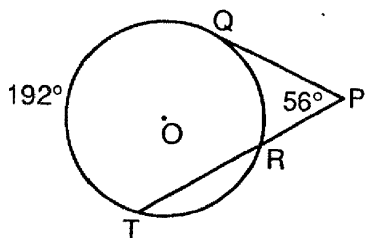


- 6 Two tangents \overline{PA} and \overline{PB} are drawn to circle O from an external point P . If the measure of major arc \widehat{AB} is 250° , find the measure of $\angle P$.

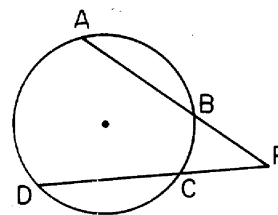
- 7 Two tangents to a circle from an external point intercept a major arc of 300° . Find the number of degrees in the angle formed by the two tangents.
- 8 In a circle, two tangents from an external point intercept a major arc of 240° . Find the number of degrees in the angle formed by the tangents.
- 9 Two tangents are drawn to circle O from external point P . If the major arc formed has a measure of 280° , find $m\angle P$.
- 10 Tangents \overline{PA} and \overline{PB} are drawn from point P to the same circle. The major arc intercepted by the tangents is three times the minor arc. Find $m\angle APB$.
- 11 Two tangents are drawn to a circle from an external point. If the measure of the major arc is 260° , what is the measure, in degrees, of the angle formed by the two tangents?
- 12 Two tangents are drawn to a circle from external point P . If the minor arc has a measure of 100° , find $m\angle P$.
- 13 In the accompanying diagram of circle O , \overline{PC} is a tangent, \overline{PBA} is a secant, $m\widehat{AB} = 132$, and $m\widehat{CB} = 46$. Find $m\angle P$.



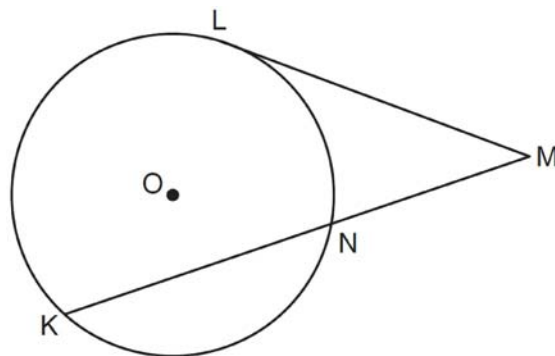
- 14 In the accompanying diagram, \overline{PQ} is tangent to circle O at Q and \overline{PRT} is a secant. If $m\angle P = 56$ and $m\widehat{QT} = 192$, find $m\widehat{QR}$.



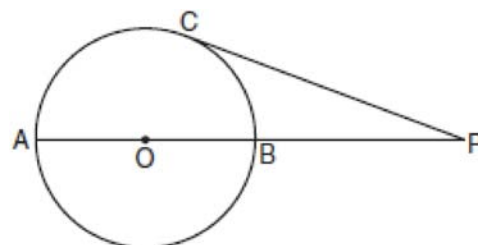
- 15 In the accompanying diagram, \overline{PBA} and \overline{PCD} are secants to the circle. If $m\angle P = 40$ and $m\widehat{AD} = 120$, find $m\widehat{BC}$.



- 16 In the diagram below, tangent \overline{ML} and secant \overline{MNK} are drawn to circle O . The ratio $m\widehat{LN} : m\widehat{NK} : m\widehat{KL}$ is 3:4:5. Find $m\angle LMK$.



- 17 In the accompanying diagram of circle O , diameter \overline{AOB} is extended through B to external point P , tangent \overline{PC} is drawn to point C on the circle, and $m\widehat{AC} : m\widehat{BC} = 7:2$. Find $m\angle CPA$.



(Not drawn to scale)

- 18 Point P lies outside circle O , which has a diameter of \overline{AOC} . The angle formed by tangent \overline{PA} and secant \overline{PBC} measures 30° . Sketch the conditions given above and find the number of degrees in the measure of minor arc CB .

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Answer Section

1 ANS: 1

$$\frac{70 - 20}{2} = 25$$

REF: 011325ge

2 ANS: 3

REF: 018531siii

3 ANS: $\overline{2}$

$$\frac{140 - \overline{RS}}{2} = 40$$

$$140 - \overline{RS} = 80$$

$$\overline{RS} = 60$$

REF: 081025ge

4 ANS: 3

REF: 060025siii

5 ANS:

40

REF: 060924b

6 ANS:

70°

REF: 068113siii

7 ANS:

120

REF: 068612siii

8 ANS:

60

REF: 019609siii

9 ANS:

100

REF: 089711siii

10 ANS:

90

REF: 069011siii

11 ANS:

80

REF: 010309siii

12 ANS:
80

REF: 080313siii

13 ANS:
68

REF: 080925b

14 ANS:
80

REF: 089510siii

15 ANS:
40

REF: 088910siii

16 ANS:

$$30. \quad 3x + 4x + 5x = 360. \quad m\widehat{LN} : m\widehat{NK} : m\widehat{KL} = 90 : 120 : 150. \quad \frac{150 - 90}{2} = 30$$

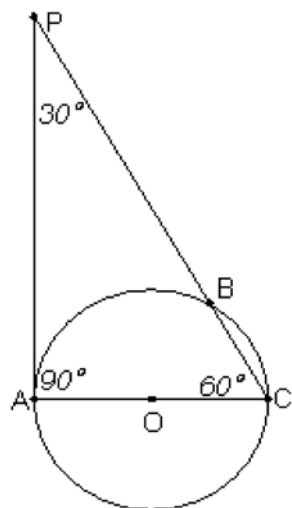
$$x = 20$$

REF: 061136ge

17 ANS:
50

REF: 010721b

18 ANS:



$$m\widehat{CB} = 60$$

REF: 060132b