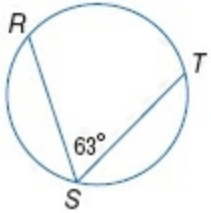


10-4 Inscribed Angles

Find each measure.

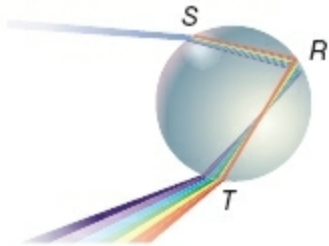
2. $m\widehat{RT}$



ANSWER:

126

4. **SCIENCE** The diagram shows how light bends in a raindrop to make the colors of the rainbow. If $m\widehat{ST} = 144$, what is $m\angle R$?

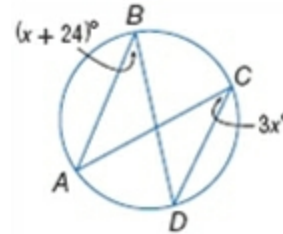


ANSWER:

72

ALGEBRA Find each measure.

6. $m\angle B$

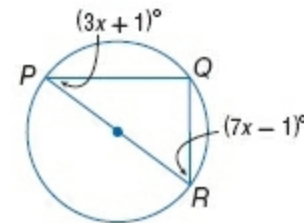


ANSWER:

36

CCSS STRUCTURE Find each value.

8. $m\angle R$

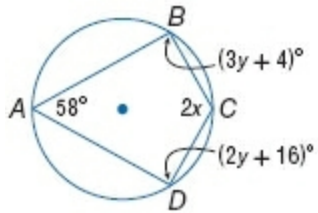


ANSWER:

62

10-4 Inscribed Angles

10. $m\angle C$ and $m\angle D$



ANSWER:

122; 80

ALGEBRA Find each measure.

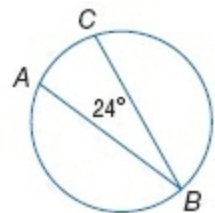
12. $m\angle K$



ANSWER:

46

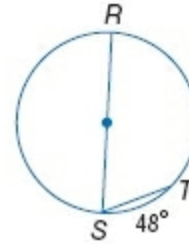
14. $m\widehat{AC}$



ANSWER:

48

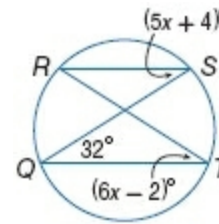
16. $m\angle S$



ANSWER:

66

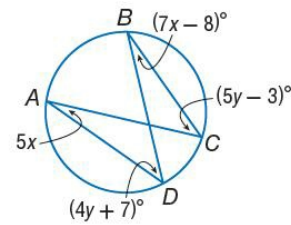
18. $m\angle S$



ANSWER:

34

20. $m\angle C$



ANSWER:

47

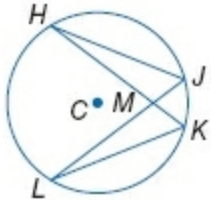
10-4 Inscribed Angles

PROOF Write the specified type of proof.

22. two-column proof

Given: $\odot C$

Prove: $\triangle KML \sim \triangle JMH$

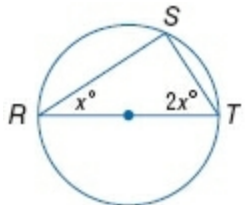


ANSWER:

Statements (Reasons):

1. $\odot C$ (Given)
2. $\angle H \cong \angle L$ (Inscribed \angle s intercepting same arc are \cong .)
3. $\angle KML \cong \angle JMH$ (Vertical \angle s are \cong .)
4. $\triangle KML \sim \triangle JMH$ (AA Similarity)

ALGEBRA Find each value.



24. $m\angle T$

ANSWER:

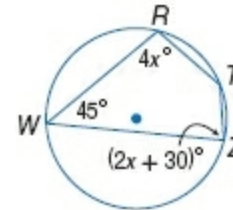
60

26. $m\angle C$

ANSWER:

51.75

CCSS STRUCTURE Find each measure.

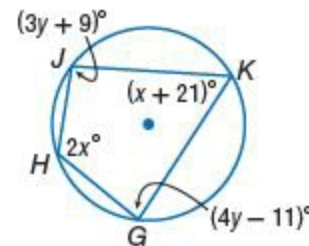


28. $m\angle Z$

ANSWER:

80

CCSS STRUCTURE Find each measure.



30. $m\angle G$

ANSWER:

93

10-4 Inscribed Angles

SIGNS: A stop sign in the shape of a regular octagon is inscribed



in a circle. Find each measure.

32. $m\widehat{NPQ}$

ANSWER:

135

34. $m\angle LRQ$

ANSWER:

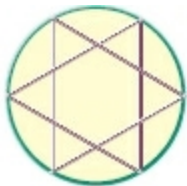
112.5

36. **ART** Four different string art star patterns are shown. If all of the inscribed angles of each star shown are congruent, find the measure of each inscribed angle.

a.



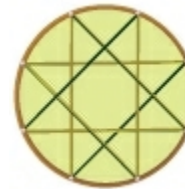
b.



c.



d.



ANSWER:

a. 36

b. 60

c. $\frac{180}{7}$ or about 25.7

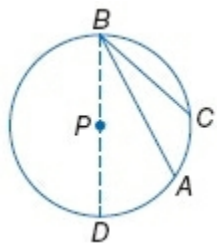
d. 45

10-4 Inscribed Angles

38. Case 3

Given: P lies outside $\angle ABC$. \overline{BD} is a diameter.

Prove: $m\angle ABC = \frac{1}{2}m\widehat{AC}$



ANSWER:

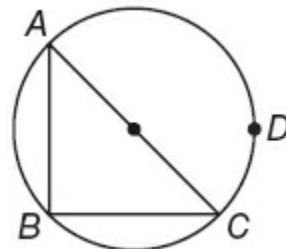
Proof:

Statements (Reasons)

1. $m\angle ABC = m\angle DBC - m\angle DBA$ (\angle Addition Postulate, Subtraction Property of Equality)
2. $m\angle DBC = \frac{1}{2}m(\text{arc } DC)$
 $m\angle DBA = \frac{1}{2}m(\text{arc } DA)$ (The measure of an inscribed \angle whose side is a diameter is half the measure of the intercepted arc (Case 1)).
3. $m\angle ABC = \frac{1}{2}m(\text{arc } DC) - \frac{1}{2}m(\text{arc } DA)$ (Substitution)
4. $m\angle ABC = \frac{1}{2} [m(\text{arc } DC) - m(\text{arc } DA)]$ (Factor)
5. $m(\text{arc } DA) + m(\text{arc } AC) = m(\text{arc } DC)$ (Arc Addition Postulate)
6. $m(\text{arc } AC) = m(\text{arc } DC) - m(\text{arc } DA)$ (Subtraction Property of Equality)
7. $m\angle ABC = \frac{1}{2}m(\text{arc } AC)$ (Substitution)

40. Theorem 10.8, paragraph proof

ANSWER:



Part I: Given: \widehat{ADC} is a semicircle.

Prove: $\angle ABC$ is a right angle.

Proof: Since \widehat{ADC} is a semicircle, then $m\widehat{ADC} = 180$. Since $\angle ABC$ is an inscribed angle, then $m\angle ABC = \frac{1}{2}m\widehat{ADC}$ or 90. So, by definition, $\angle ABC$ is a right angle.

Part II: Given: $\angle ABC$ is a right angle.

Prove: \widehat{ADC} is a semicircle.

Proof: Since $\angle ABC$ is an inscribed angle, then $m\angle ABC = \frac{1}{2}m\widehat{ADC}$ and by the Multiplication Property of Equality, $m\widehat{ADC} = 2m\angle ABC$. Because $\angle ABC$ is a right angle, $m\angle ABC = 90$. Then $m\widehat{ADC} = 2(90)$ or 180. So by definition, \widehat{ADC} is a semicircle.

10-4 Inscribed Angles

CCSS ARGUMENTS Determine whether the quadrilateral can always, sometimes, or never be inscribed in a circle. Explain your reasoning.

42. square

ANSWER:

Always; squares have right angles at each vertex, therefore each pair of opposite angles will be supplementary and inscribed in a circle.

44. parallelogram

ANSWER:

Sometimes; a parallelogram can be inscribed in a circle as long as it is a rectangle.

46. kite

ANSWER:

Sometimes; as long as the angles that compose the pair of congruent opposite angles are right angles.

48. **WRITING IN MATH** A $45^\circ - 45^\circ - 90^\circ$ right triangle is inscribed in a circle. If the radius of the circle is given, explain how to find the lengths of the right triangle's legs.

ANSWER:

Sample answer: According to theorem 10.8, an inscribed angle of a triangle intercepts a diameter if the angle is a right angle. Therefore, the hypotenuse is a diameter and has a length of $2r$. Using trigonometry, each leg = $\sin 45^\circ \cdot 2r$ or $\sqrt{2}r$.

50. **WRITING IN MATH** Compare and contrast inscribed angles and central angles of a circle. If they intercept the same arc, how are they related?

ANSWER:

An inscribed angle has its vertex on the circle. A central angle has its vertex at the center of the circle. If an inscribed angle and a central angle intercept the same arc, then the measure of the inscribed angle is one-half the measure of the central angle.

52. **ALGEBRA** Simplify

$$4(3x - 2)(2x + 4) + 3x^2 + 5x - 6.$$

F $9x^2 + 3x - 14$

G $9x^2 + 13x - 14$

H $27x^2 + 37x - 38$

J $27x^2 + 27x - 26$

ANSWER:

H

54. **SAT/ACT** The sum of three consecutive integers is -48 . What is the least of the three integers?

A -15

B -16

C -17

D -18

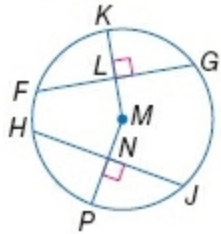
E -19

ANSWER:

C

10-4 Inscribed Angles

In $\odot M$, $FL = 24$, $HJ = 48$, and $m\widehat{HP} = 65$. Find each measure.



56. $m\widehat{PJ}$

ANSWER:

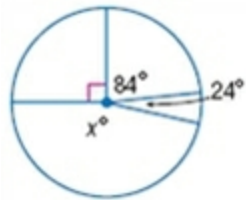
65

58. $m\widehat{HJ}$

ANSWER:

130

Find x .

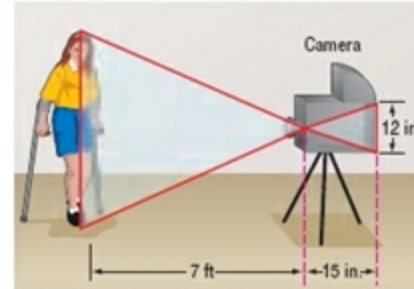


60.

ANSWER:

162

62. **PHOTOGRAPHY** In one of the first cameras invented, light entered an opening in the front. An image was reflected in the back of the camera, upside down, forming similar triangles. Suppose the image of the person on the back of the camera is 12 inches, the distance from the opening to the person is 7 feet, and the camera itself is 15 inches long. How tall is the person being photographed?



ANSWER:

5.6 ft

ALGEBRA Suppose B is the midpoint of \overline{AC} . Use the given information to find the missing measure.

64. $AB = 6y - 14$, $BC = 10 - 2y$, $AC = ?$

ANSWER:

8

66. $AB = 10s + 2$, $AC = 40$, $s = ?$

ANSWER:

1.8