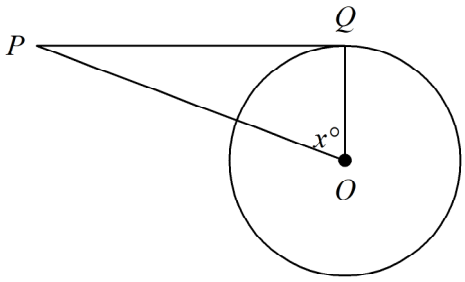
**Name:** _____ **Class:** _____ **Date:** _____ **ID: A**

# Geometry Chapter 12 Instant Chapter Test Version A SAMPLE

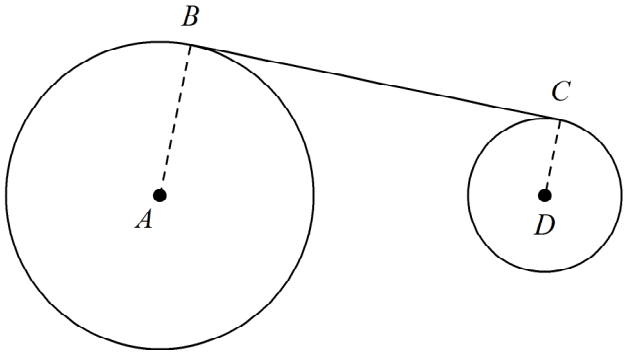
## Short Answer

**Assume that lines that appear to be tangent are tangent. *O* is the center of the circle. Find the value of *x*. (Figures are not drawn to scale.)**

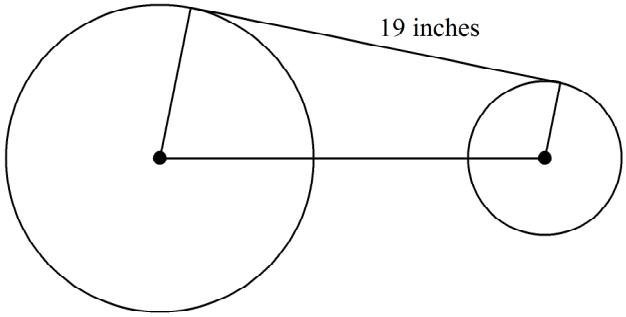
1. $m\angle P = 12$




2. $\overline{BC}$ is tangent to circle *A* at *B* and to circle *D* at *C* (not drawn to scale). $AB = 7$, $BC = 18$, and $DC = 5$. Find *AD* to the nearest tenth.

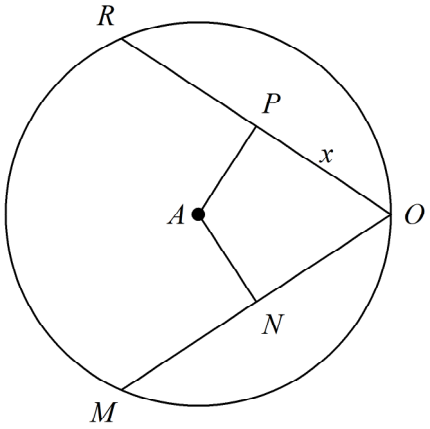



3. A chain fits tightly around two gears as shown. The distance between the centers of the gears is 20 inches. The radius of the larger gear is 11 inches. Find the radius of the smaller gear. Round your answer to the nearest tenth, if necessary. The diagram is not to scale.

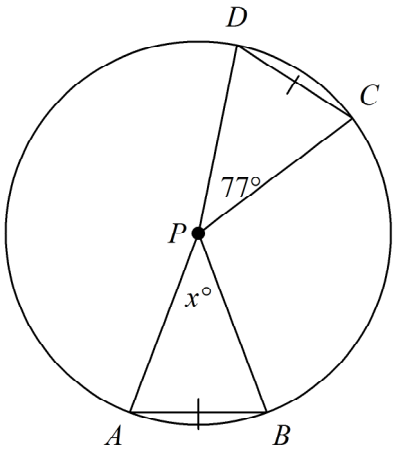


**Find the value of $x$. If necessary, round your answer to the nearest tenth. The figure is not drawn to scale.**

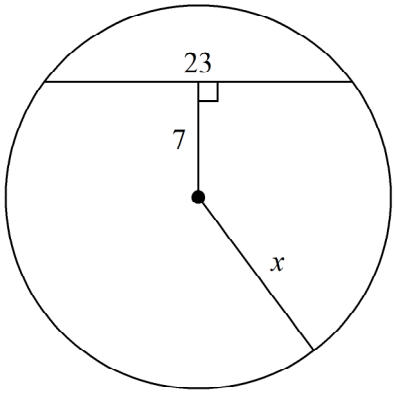
4. $\overline{NA} \cong \overline{PA}$, $\overline{MO} \perp \overline{NA}$, $\overline{RO} \perp \overline{PA}$, $MN = 6$ feet



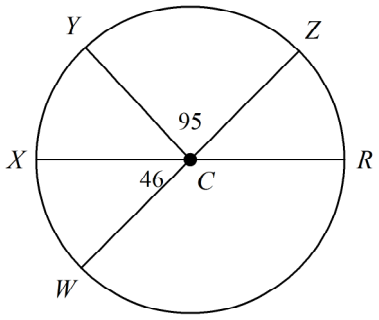

5.



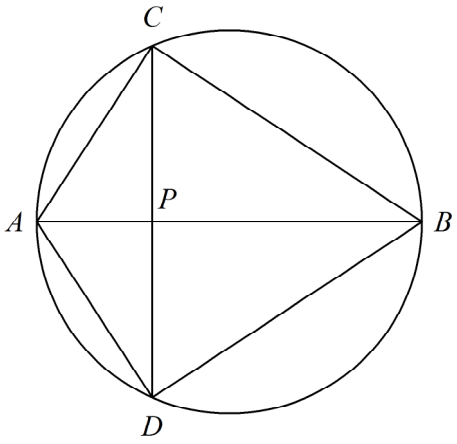

6.



7. $\overline{WZ}$ and $\overline{XR}$ are diameters. Find the measure of arc $ZWX$. (The figure is not drawn to scale.)

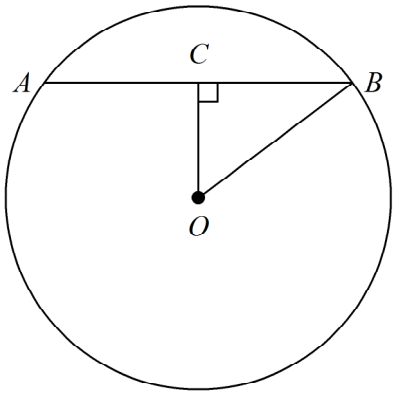



**Use the diagram. $\overline{AB}$ is a diameter, and $\overline{AB} \perp \overline{CD}$. The figure is not drawn to scale.**

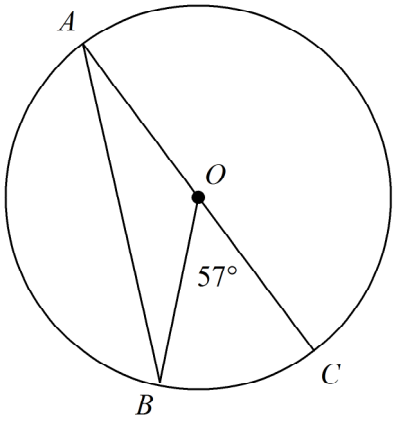



8. Find $m$(arc $BD$) for $m$(arc $AC$) = 43.

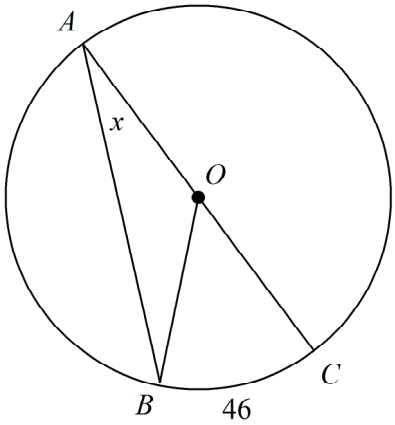
9. The radius of circle $O$ is 18, and $OC = 13$. Find $AB$. Round to the nearest tenth, if necessary. (The figure is not drawn to scale.)



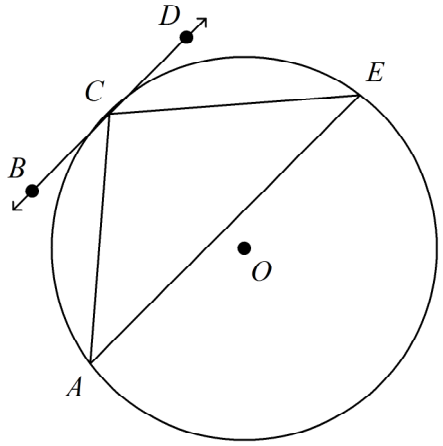

10. Find the measure of $\angle BAC$. (The figure is not drawn to scale.)



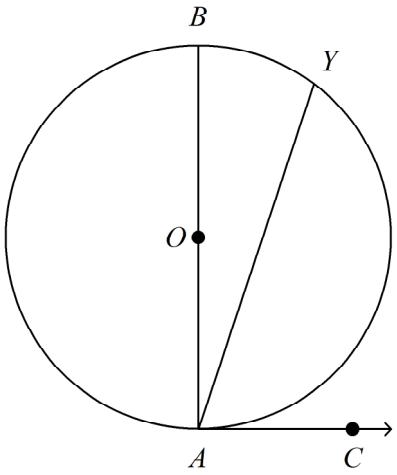

11. Find $x$. (The figure is not drawn to scale.)



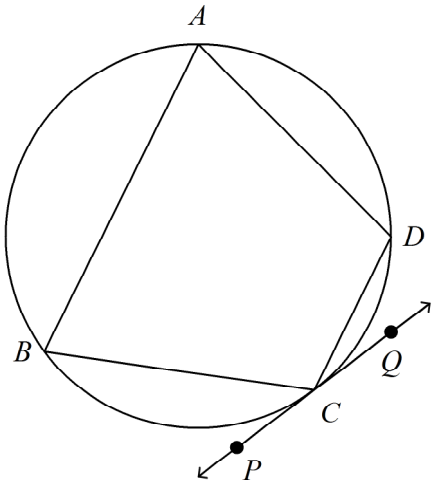
12. $\overleftrightarrow{BD}$ is tangent to circle $O$ at $C$, $m$(arc $AEC$) = 279, and $m\angle ACE$ = 85. Find $m\angle DCE$. (The figure is not drawn to scale.)



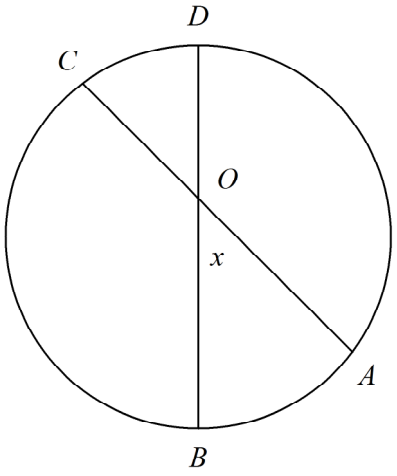

13. If $m$(arc $BY$) = 40, what is $m\angle YAC$? (The figure is not drawn to scale.)



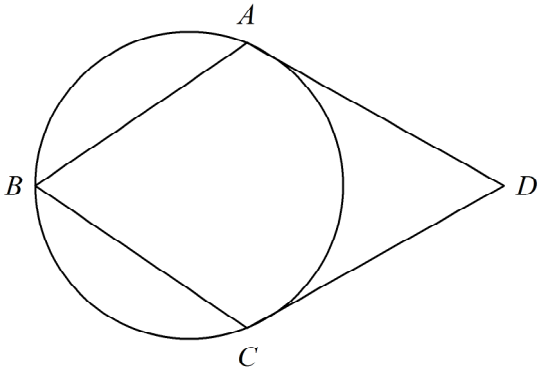
14. In the circle, $m(\text{arc } AD) = 94$, and $m\angle D = 76$. Find $m\angle DCQ$.
(The figure is not drawn to scale.)



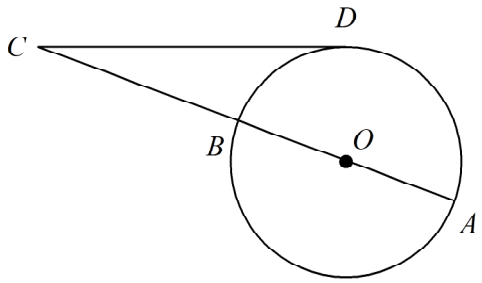

15. Find the value of $x$ for $m(\text{arc } AB) = 46$ and $m(\text{arc } CD) = 25$. (The figure is not drawn to scale.)




16. Find $m\angle D$ for $m\angle B = 50$. (The figure is not drawn to scale.)



17. Find the diameter of the circle for $BC = 16$ and $DC = 28$. Round to the nearest tenth.
(The diagram is not drawn to scale.)




18. A footbridge is in the shape of an arc of a circle. The bridge is 7 ft tall and 16 ft wide. What is the radius of the circle that contains the bridge? Round to the nearest tenth.

19. Write the equation of the locus of all points in the coordinate plane 10 units from (–6, 9).

**Describe the locus in space.**

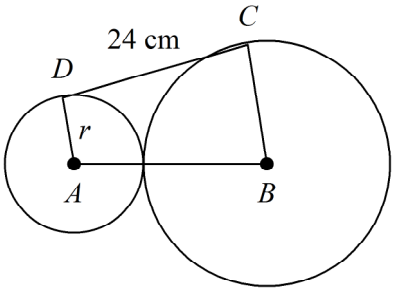
20. points 4 mm from a line $\overleftrightarrow{AB}$

21. Graph the circle with equation $(x + 1)^2 + (y - 3)^2 = 9$.

22. Describe and draw the locus of points in space that are 2 inches from $\overline{AB}$ that is 10 inches long.

**Essay**

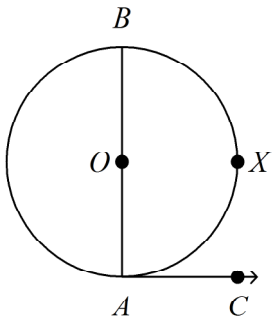
23. These two noncongruent circles intersect in exactly one point. Their common tangent is 24 cm, and the distance between their centers is 25 cm.



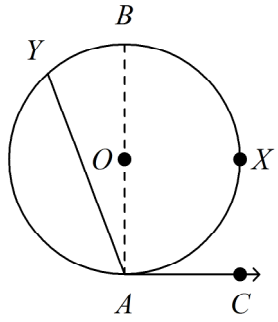

**a.** What is the sum of the two radii?
**b.** Express the radius of circle $B$ in terms of $r$, the radius of circle $A$.
**c.** Find the radius of circle $B$. Show your work.

24. The chord-tangent theorem states that the measure of the angle formed by a chord and a tangent segment that intersect at the tangent's point of contact is equal to one half the measure of the intercepted arc. Below are three possible cases of this theorem.

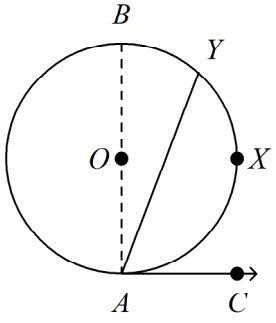
Case I




Case II

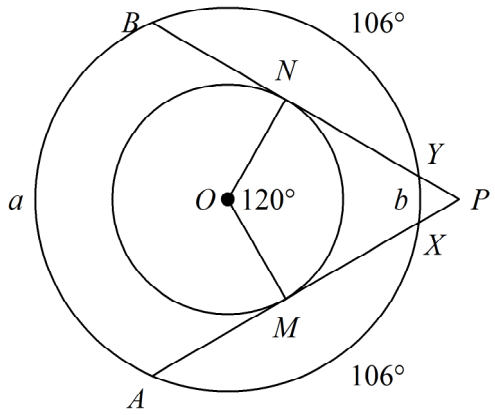



Case III




Given that Case I is true, prove Case II of the chord-tangent theorem.

25. Given: The circles share the same center, $O$, $m\angle MON = 120$, and $m(\text{arc } AX) = m(\text{arc } BY) = 106$.




**a.** Find $m\angle P$. Show your work.
**b.** Find $a$ and $b$. Explain your reasoning.

# Geometry Chapter 12 Instant Chapter Test Version A SAMPLE
# Answer Section

## SHORT ANSWER

1. ANS:
78

PTS: 1 DIF: L2 REF: 12-1 Tangent Lines
OBJ: 12-1.1 Using the Radius-Tangent Relationship STA: CA GEOM 7.0| CA GEOM 21.0
TOP: 12-1 Example 1
KEY: tangent to a circle | point of tangency | angle measure | properties of tangents | central angle

2. ANS:
18.1

PTS: 1 DIF: L2 REF: 12-1 Tangent Lines
OBJ: 12-1.1 Using the Radius-Tangent Relationship STA: CA GEOM 7.0| CA GEOM 21.0
TOP: 12-1 Example 2
KEY: tangent to a circle | point of tangency | properties of tangents | Pythagorean Theorem

3. ANS:
4.8 inches

PTS: 1 DIF: L2 REF: 12-1 Tangent Lines
OBJ: 12-1.1 Using the Radius-Tangent Relationship STA: CA GEOM 7.0| CA GEOM 21.0
TOP: 12-1 Example 2
KEY: word problem | tangent to a circle | point of tangency | properties of tangents | right triangle | Pythagorean Theorem

4. ANS:
3 ft

PTS: 1 DIF: L2 REF: 12-2 Chords and Arcs
OBJ: 12-2.1 Using Congruent Chords, Arcs, and Central Angles
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-2 Example 2
KEY: circle | radius | chord | congruent chords | bisected chords

5. ANS:
77

PTS: 1 DIF: L2 REF: 12-2 Chords and Arcs
OBJ: 12-2.1 Using Congruent Chords, Arcs, and Central Angles
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-2 Example 1
KEY: arc | central angle | congruent arcs

6. ANS:
13.5

PTS: 1 DIF: L2 REF: 12-2 Chords and Arcs
OBJ: 12-2.2 Lines Through the Center of a Circle
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-2 Example 3
KEY: bisected chords | circle | perpendicular | perpendicular bisector | Pythagorean Theorem

7. ANS:
226

PTS: 1 DIF: L2 REF: 12-2 Chords and Arcs
OBJ: 12-2.1 Using Congruent Chords, Arcs, and Central Angles
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-2 Example 1
KEY: arc | central angle | congruent arcs | arc measure | arc addition | diameter

8. ANS:
137°

PTS: 1 DIF: L3 REF: 12-2 Chords and Arcs
OBJ: 12-2.2 Lines Through the Center of a Circle
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-2 Example 3
KEY: arc | chord-arc relationship | diameter | chord | perpendicular | angle measure | circle | right triangle | perpendicular bisector

9. ANS:
24.9

PTS: 1 DIF: L2 REF: 12-2 Chords and Arcs
OBJ: 12-2.2 Lines Through the Center of a Circle
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-2 Example 3
KEY: bisected chords | circle | perpendicular | perpendicular bisector | Pythagorean Theorem

10. ANS:
28.5

PTS: 1 DIF: L3 REF: 12-3 Inscribed Angles
OBJ: 12-3.1 Finding the Measure of an Inscribed Angle
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-3 Example 2
KEY: circle | inscribed angle | intercepted arc | inscribed angle-arc relationship

11. ANS:
23

PTS: 1 DIF: L2 REF: 12-3 Inscribed Angles
OBJ: 12-3.1 Finding the Measure of an Inscribed Angle
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-3 Example 1
KEY: circle | inscribed angle | intercepted arc | inscribed angle-arc relationship

12. ANS:
54.5

PTS: 1 DIF: L2 REF: 12-3 Inscribed Angles
OBJ: 12-3.2 The Angle Formed by a Tangent and a Chord
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-3 Example 3
KEY: circle | inscribed angle | tangent-chord angle | intercepted arc

13. ANS:
70

PTS: 1 DIF: L2 REF: 12-3 Inscribed Angles
OBJ: 12-3.2 The Angle Formed by a Tangent and a Chord
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-3 Example 3
KEY: circle | inscribed angle | tangent-chord angle | intercepted arc | arc measure | angle measure

14. ANS:
57

PTS: 1 DIF: L2 REF: 12-3 Inscribed Angles
OBJ: 12-3.2 The Angle Formed by a Tangent and a Chord
STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0 TOP: 12-3 Example 3
KEY: circle | inscribed angle | tangent-chord angle | intercepted arc | arc measure | angle measure

15. ANS:
35.5°

PTS: 1 DIF: L2 REF: 12-4 Angle Measures and Segment Lengths
OBJ: 12-4.1 Finding Angle Measures STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0
TOP: 12-4 Example 1
KEY: circle | secant | angle measure | arc measure | intersection inside the circle

16. ANS:
80

PTS: 1 DIF: L3 REF: 12-4 Angle Measures and Segment Lengths
OBJ: 12-4.1 Finding Angle Measures STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0
TOP: 12-4 Example 1
KEY: circle | chord | angle measure | arc measure | intersection on the circle | intersection outside the circle

17. ANS:
33

PTS: 1 DIF: L2 REF: 12-4 Angle Measures and Segment Lengths
OBJ: 12-4.2 Finding Segment Lengths STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0
TOP: 12-4 Example 3
KEY: circle | intersection outside the circle | secant | tangent | diameter

18. ANS:
8.1 ft

PTS: 1 DIF: L2 REF: 12-4 Angle Measures and Segment Lengths
OBJ: 12-4.2 Finding Segment Lengths STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0
TOP: 12-4 Example 4
KEY: arc | radius | intersection inside the circle | chord | segment length | word problem

19. ANS:

$(x + 6)^2 + (y - 9)^2 = 100$

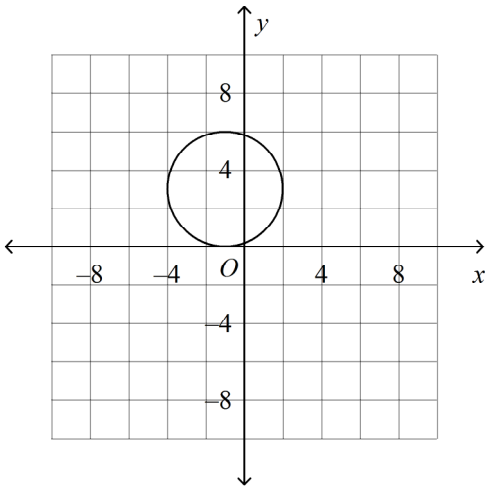
PTS: 1 DIF: L3 REF: 12-6 Locus: A Set of Points
OBJ: 12-6.1 Drawing and Describing a Locus TOP: 12-6 Example 2
KEY: locus | equation of a circle

20. ANS:

an endless cylinder with radius 4 mm and centerline $\overleftrightarrow{AB}$

PTS: 1 DIF: L2 REF: 12-6 Locus: A Set of Points
OBJ: 12-6.1 Drawing and Describing a Locus TOP: 12-6 Example 3
KEY: locus

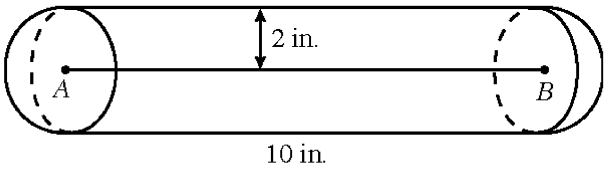
21. ANS:




PTS: 1 DIF: L3 REF: 12-5 Circles in the Coordinate Plane
OBJ: 12-5.2 Finding the Center and Radius of a Circle STA: CA GEOM 7.0| CA GEOM 17.0
TOP: 12-5 Example 3 KEY: circle | coordinate plane | center

22. ANS:

The locus is a cylinder with a radius of 2 inches and a height of 10 inches, without the two circular bases. The center segment of the cylinder is $\overline{AB}$. At each end of the cylinder is a hemisphere, each with a radius of 2 inches.




PTS: 1 DIF: L3 REF: 12-6 Locus: A Set of Points
OBJ: 12-6.1 Drawing and Describing a Locus TOP: 12-6 Example 3
KEY: locus

**ESSAY**

23. ANS:

[4] **a.** 25 cm

**b.** $25 - r$

**c.** Let $r + x$ represent the radius of circle $B$.

$x^2 + 24^2 = 25^2$; $x = 7$; $r + 7 = 25 - r$; $r = 9$

$r + x = 9 + 7 = 16$; 16 cm

[3] one computational error

[2] incomplete work in part c OR correct answers with no work shown

[1] only two parts correct

PTS: 1 DIF: L4 REF: 12-1 Tangent Lines

OBJ: 12-1.2 Using Multiple Tangents STA: CA GEOM 7.0| CA GEOM 21.0

KEY: extended response | rubric-based question | point of tangency | properties of tangents | Pythagorean Theorem | right triangle | tangent to a circle

24. ANS:

[4] By the inscribed angle theorem, $m\angle BAY = \frac{1}{2} m(\text{arc } BY)$. By Case I, we know

$m\angle BAC = \frac{1}{2} m(arcBXA)$.

It follows that $m\angle BAC + m\angle BAY = \frac{1}{2}[m(arcBXA) + m(arcBY)]$.

Therefore, $m\angle CAY = \frac{1}{2} m(\text{arc } AXY)$.

[3] error in angle or arc name

[2] illogical sequence of steps OR no reasons stated for important steps

[1] missing step

PTS: 1 DIF: L3 REF: 12-3 Inscribed Angles

OBJ: 12-3.2 The Angle Formed by a Tangent and a Chord

STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0

KEY: extended response | rubric-based question | circle | angle measure | angle-arc relationship | arc addition | arc measure | diameter | inscribed angle | inscribed angle-arc relationship | intercepted arc | proof | tangent-chord angle

25. ANS:

[4] **a.** 60; $120 + 90 + 90 + m\angle P = 360$

**b.** $\frac{1}{2}(a - b) = 60$; $a - b = 120$

$a + b + 2(106) = 360$; $a + b = 148$

$a = 134$; $b = 14$

[3] one computational error

[2] correct answers with no work shown

[1] only one part correct

PTS: 1 DIF: L4 REF: 12-4 Angle Measures and Segment Lengths
OBJ: 12-4.1 Finding Angle Measures STA: CA GEOM 2.0| CA GEOM 7.0| CA GEOM 21.0
KEY: extended response | rubric-based question | circle | angle measure | angle-arc relationship | arc addition | arc measure | inscribed angle | inscribed angle-arc relationship | intercepted arc | tangent to a circle | central angle | intersection on the circle | intersection outside the circle