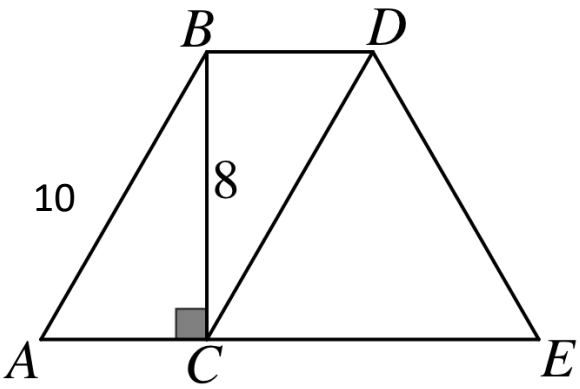
Date Completed: _____
Mentor Initials: _____

Geometry (Intermediate)

Multiple Choice

Use the information below to answer questions 1 – 3.

In the diagram below, $\overline{BD} \parallel \overline{AE}$, $\overline{AB} \parallel \overline{CD}$ and ΔCDE is equilateral.



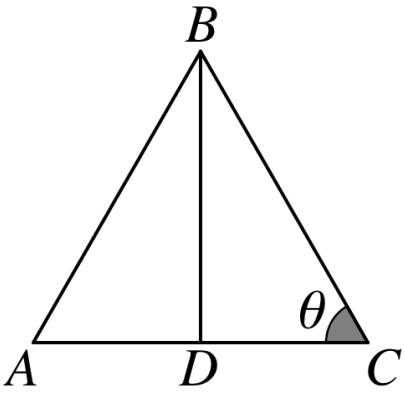
1. What is the perimeter of $CBDE$?
A) 24
B) 28
C) 34
D) $8 + 40\sqrt{3}$

2. What is the area of $ABDC$?
A) 24
B) 32
C) 48
D) 80

3. What is the sum of the measures of $\angle EDC$ and $\angle BCE$?
A) 120°
B) 145°
C) 150°
D) 160°

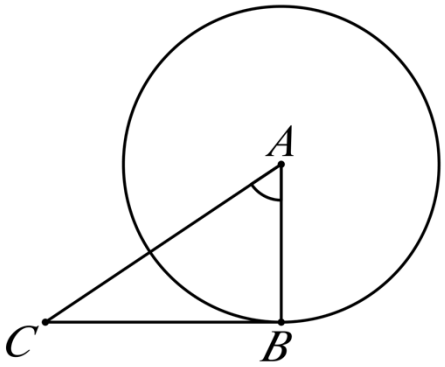
4. The equilateral triangle ABC is shown below. $\overline{BD}$ is the perpendicular bisector of $\overline{AC}$, and $\overline{BD}$ measures $8\sqrt{3}$ inches. What is the perimeter of ΔABC, in inches?

A) 24
B) $24\sqrt{3}$
C) 48
D) $64\sqrt{3}$



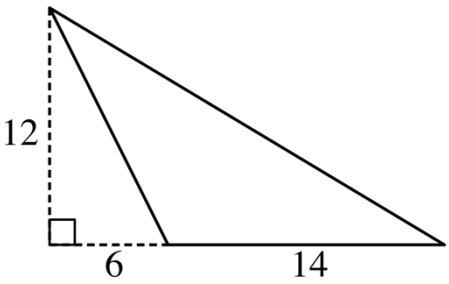
5. In the diagram to the right, $\overline{CB}$ is tangent to circle A at point B, and $\angle CAB = 56.49°$. What is the measure of ∠ACB, to the nearest degree?

A) 23°
B) 29°
C) 34°
D) 37°
E) 45°



6. The height of the triangle to the right is 12 units. What is its area, in square units?

A) 72
B) 84
C) 168
D) 240

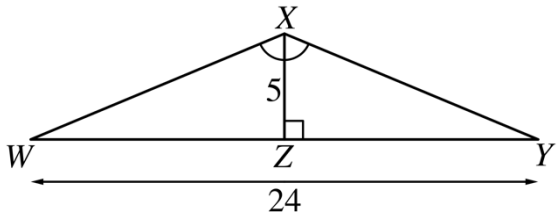


7. An angle is bisected, and each of the resulting angles is trisected. The final angle measure of each resulting angle is 12.5°. What was the measure of the original angle?

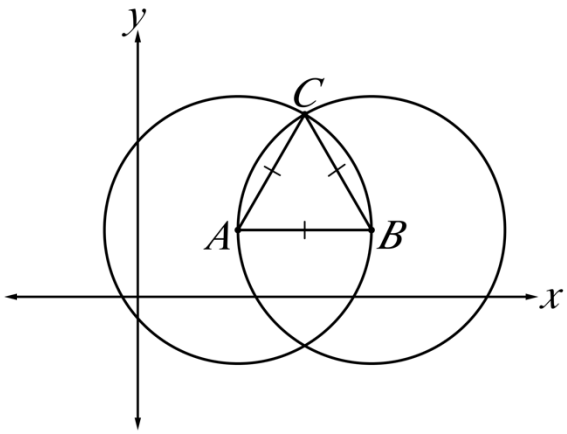
A) 58°
B) 65°
C) 72°
D) 75°

8. In the figure to the right, $\overline{XZ}$ is the perpendicular bisector of ΔWXY, and $\overline{WY} = 24$. What is the ratio of the area to the perimeter of ΔWXY?

A) 6: 5
B) 4: 3
C) 3: 5
D) 2: 3



Use the information below to answer questions 9 – 10



In the diagram, ΔABC is inscribed between two overlapping circles with center points $A\ (3, 2)$ and $B\ (7, 2)$. ΔABC is an equilateral triangle.

9. What is the circumference of the circle with center point A?

A) 4π
B) 8π
C) 12π
D) 16π

10. What is the length of the arc between points B and C on circle A?

A) $\frac{1}{2}\pi$

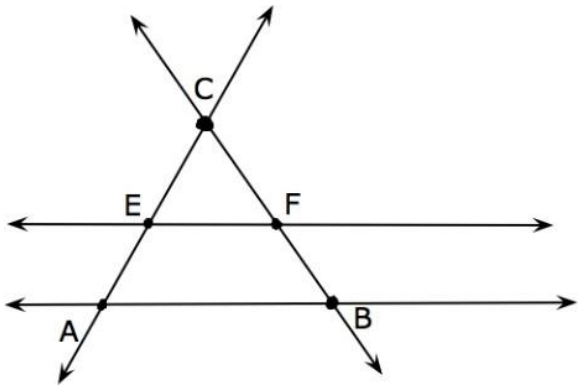
B) π

C) $\frac{4}{3}\pi$

D) 2π

11. In the figure to the right, ΔABC is an equilateral triangle. $\overleftrightarrow{AB} \parallel \overleftrightarrow{EF}$, E bisects $\overleftrightarrow{AC}$ and F bisects $\overleftrightarrow{BC}$. What is the ratio of the area of ΔEFC to that of ΔABC?

A) 1:4
B) 1:3
C) 1:1
D) 2:1



12. A circle is inscribed in a square that has a perimeter of 40 centimeters. What is the area of the circle, in centimeters squared?

A) 10π
B) 25π
C) 40π
D) 50π

13. Two cylinders both have a height of 4, but the first cylinder has a radius of 3, and the second has a radius of 5. What is the ratio of the volume of these cylinders?

A) 3:5
B) 7:9
C) 9:25
D) 27:125

14. In ΔABC, $\overline{AB}$ = 5 cm, $\overline{AC}$ = 10 cm, $m\angle A = 60$, and $\overline{AC}$ is the longest side. Which of the following statements about the measures of the angles in ΔABC must be true?

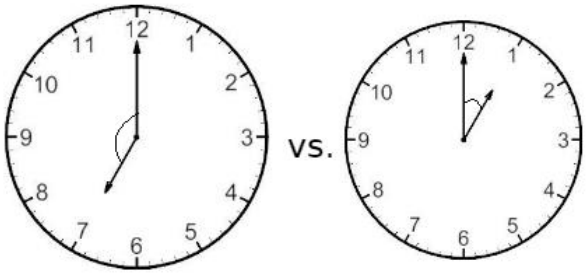
A) $m\angle A = m\angle B = m\angle C$
B) $m\angle B > m\angle A > m\angle C$
C) $m\angle B = m\angle C > m\angle A$
D) $m\angle C > m\angle A > m\angle B$

15. Triangle TUV is a right triangle, where angle U is a right angle, angle $T = 60$ and side $\overline{TV}$ is 6. What is the length of side $\overline{UV}$?

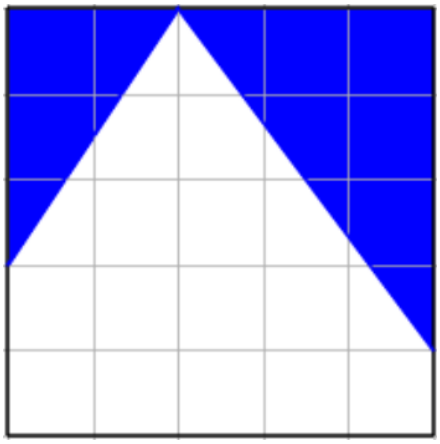
A) 3
B) $3\sqrt{3}$
C) 6
D) $6\sqrt{3}$

Grid-In

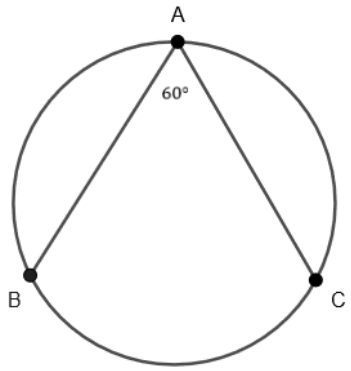
16. How much larger, in degrees, is the smallest angle created by the hour and minute hand at 7:00 than the smallest angle created by the hour and minute hand at 1:00?



17. A 5-inch-by-5-inch square grid shown below is divided into 25 squares, each with a side length of 1 inch. Each vertex of the two shaded triangles lies at an intersection of 2 grid lines. What fractional part of the 5-inch-by-5-inch square is shaded?



18. Points A, B, and C lie on the circle as shown. What is the measure, in degrees, of arc $\widehat{BC}$?



19. Point R exists at some distance from a circle. Lines are drawn from point R and run tangent to the circle at points P and Q. If $\angle PRQ$ is 50°, what is the measure, in degrees, of ∠RPQ?

20. Given the circle below with $AB = \frac{6}{\pi}$ and $\angle BAC = 60°$, what is the length of arc $\widehat{BC}$?