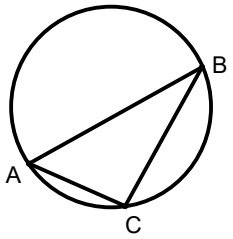
1. In circle O, $m\overset{\frown}{AC} : m\overset{\frown}{BC} : m\overset{\frown}{AB} = 2:3:4$. Determine the degree measure of $\angle BAC$.



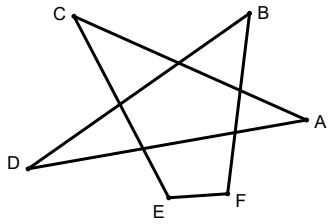
2. Triangle ΔABC is a right triangle with right angle at C, $BC = 12$, and $\angle ABC = 30°$. Determine the exact sum $(AB + AC)$.

3. Two angles, measure in degrees, in an isosceles triangle are integers. Determine <u>*the sum*</u> of the largest and smallest possible degree angle measures in that triangle.

4. Isosceles ΔABC is isosceles with base $\overline{AB}$ on the positive x-axis, point C in the first quadrant, $AC = 20$, and vertex $\angle C = 120°$. Point C is then pulled up vertically to point C', leaving $\overline{AB}$ fixed, so that vertex $\angle C' = 90°$. Determine the length of side $\overline{AC'}$.

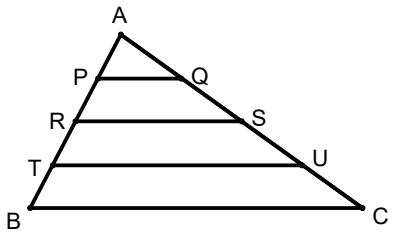
5. A triangle with perimeter 12 has an inscribed circle with an area of π. Determine the numeric area of the triangle.

6. Determine the sum of the degree measures of the angles with vertices at A, B, C, D, E, and F.



7. A solar panel is in the shape of a rectangle. Three times the perimeter of the solar panel is ten times the length of the solar panel. The width of the panel is 40 feet. Determine the number of square feet in the area of the solar panel.

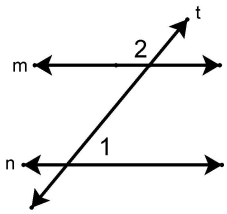
8. In ΔABC, three segments parallel to $\overline{BC}$ divide each of the other two corresponding sides into four congruent segments each. The numeric area of quadrilateral $BTUC$ is 21. Determine the numeric area of ΔABC.



9. Determine the midpoint $M(x,y)$ of the segment joining $A(20,21)$ with $B(6,-33)$. Express you answer as that ordered pair (x,y).

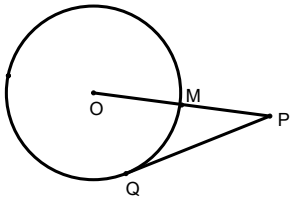
10. Determine the exact distance between the two lines $20x+21y=10$ and $20x+21y=24$. Express your answer as an integer or as a common or improper fraction.

11. Parallel lines m and n are cut by transversal t. The measure of $\angle 1 = 20.21°$. Determine the exact decimal degree measure of $\angle 2$.

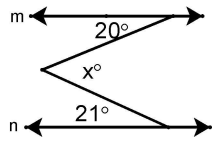


12. Quadrilateral $QRST$ is inscribed in a circle with $m\widehat{QTS} = (x^2+2x+185)°$, $m\widehat{QRS} = (3x+91)°$, and $\widehat{RS} = (5x)°$. Determine the exact decimal degree measure of $m\angle QTR$.

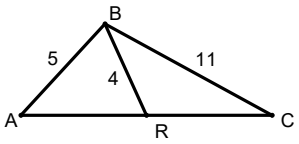
13. Segment $\overline{PQ}$ is tangent to circle O at point Q with $PQ = 3\sqrt{3}$. Segment $\overline{OP}$ intersects the circle at point M which is also the midpoint of $\overline{OP}$. Determine the length of the radius of circle O.



14. Determine the value of x in the diagram with parallel lines m and n and angles with measures as marked.

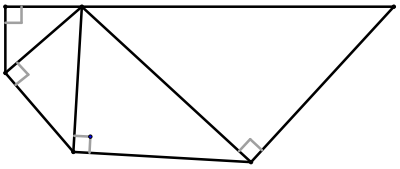


15. In ΔABC, $AB = 5$ and $BC = 11$. Point R is the midpoint of $\overline{AC}$ and $BR = 4$. Determine the length of $\overline{AC}$.

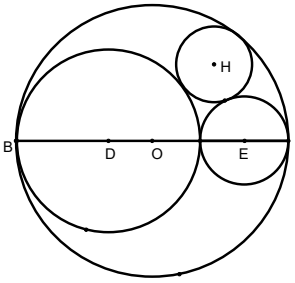


16. Determine the slope of the line parallel to $20x - 21y + 30 = 0$. Express your answer as an integer or as a common or improper fraction.

17. Four "consecutive" isosceles right triangles are shown in the diagram. The length of the shortest segment in the diagram (not counting the segments forming right angle marks) is 25. Determine the length of the longest segment in the diagram.



18. Circle O contains three circles, D, E, and H, with each circle tangent to the other three as shown. Circle E has radius 7 and circle D has radius 14. Determine the exact radius of circle H.



19. The measure of one of two complementary angles is 10 more than 3 times the other. Determine the degree measure of the larger of these two angles.

20. Evie and Xavier walk away from each other so that their paths form an acute angle, walking in a straight line, and at a constant rate. After Evie walks 20 feet, she and Xavier are 24 feet apart. They continue to walk their straight paths at their constant rates. Determine the number of feet additionally Evie must walk so that she and Xavier are 288 feet apart.

A

Geometry

Name _____

_____ Correct X **2** pts. ea. = ☐

Note: All answers must be written legibly in simplest form, according to the specifications stated in the Contest Manual. Exact answers are to be given unless otherwise specified in the question. No units of measurement are required.

1. _____ **11.** _____

2. _____ **12.** _____

3. _____ **13.** _____

4. _____ **14.** _____

5. _____ **15.** _____

6. _____ **16.** _____

7. _____ **17.** _____

8. _____ **18.** _____

9. _____ **19.** _____

10. _____ **20.** _____

By submitting this answer sheet, I certify that the work and answers submitted is entirely my own, I have used no outside help, and I have followed all rules for the event.