

Understanding the properties of the circumcenter of a triangle by using constructions and proofs, Practice Set C

Name:

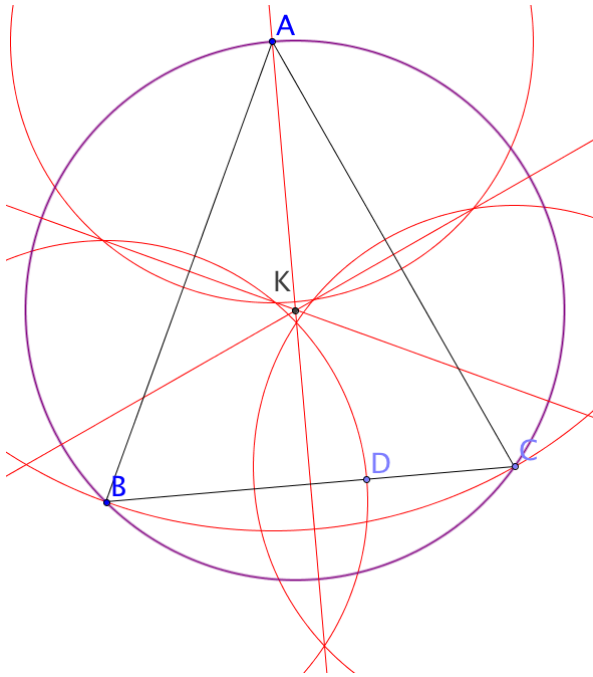
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1. Construct an isosceles triangle and its circumscribed circle. Justify your work.
2. The vertices of triangle ABC are $A(2,17)$, $B(2,-3)$, $C(7,-3)$. Find the area of the circumscribed circle and justify your work.

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Answer Key

1. Construct an isosceles triangle and its circumscribed circle. Justify your work.



1. Construct the isosceles triangle ABC by drawing a circle with center A. Mark two points on the circle B and C.
2. Construct the perpendicular bisectors of segments BC, AC, and AB, since the circumcenter of a triangle is the intersection of the perpendicular bisectors of the sides of the triangle.
3. Mark the intersection of the perpendicular bisectors as point K. Circle K is the circumscribed circle for triangle ABC since K is the circumcenter of the triangle.

2. The vertices of triangle ABC are $A(2,17)$, $B(2,-3)$, $C(7,-3)$. Find the area of the circumscribed circle and justify your work.

The triangle is a right triangle, and the circumcenter of the triangle will be $(4,7)$ since it will be on the hypotenuse of the triangle and will lie on the bisector of each of the legs. The perpendicular bisector of segment BC is $x=4$ and the perpendicular bisector of segment AB is $y=7$. Circumcenter $(4,7)$ is equidistant from each vertex of the triangle, and that distance is the radius of the circumscribed circle. The distance from $(4,7)$ to any one of the vertices can be found by using the distance formula. This is the square root of 104. Using the formula for the area of a circle, the area of the circumscribed circle is 104π .