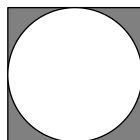


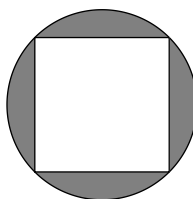


Try these problems before watching the lesson.

1. What is the area of an equilateral triangle with side length 20?
2. The square in the diagram below has side length 10 units. What is the area of the shaded region?

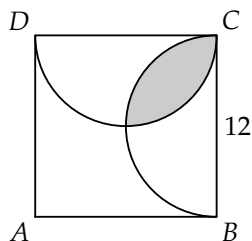


3. The square in the diagram below has side length 10 units. What is the area of the shaded region?

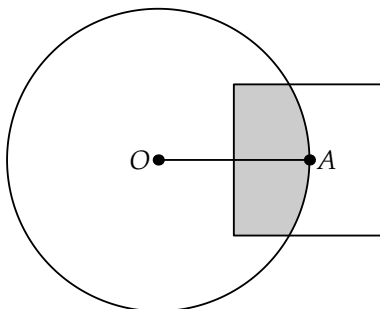


 *The Problems*

**First Problem:** Quadrilateral  $ABCD$  is a square with  $BC = 12$  cm.  $\widehat{BOC}$  and  $\widehat{DOC}$  are semicircles. What is the area of the shaded region?

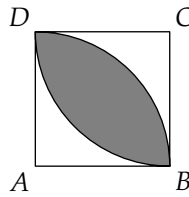


**Second Problem:** A square of side length 1 inch is drawn with its center  $A$  on a circle  $O$  of radius 1 inch such that a side of the square is perpendicular to  $\overline{OA}$ , as shown. What is the area of the shaded region?

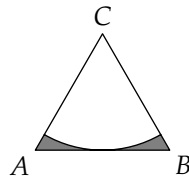


 Follow-up Problems

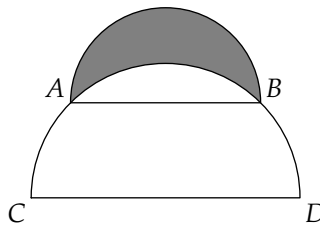
4.  $ABCD$  below is a square with side length 8 units. One arc is centered at  $A$  and the other is centered at  $C$ . What is the area of the shaded region?




5. Triangle  $ABC$  below is equilateral. The arc is centered at point  $C$  and is tangent to  $\overline{AB}$ . If  $AB = 6$ , then what is the total area of the shaded regions?



6. The shaded shape in the diagram below is called a lune. The two arcs in the diagram are semicircles with diameters  $AB = 1$  and  $CD = \sqrt{2}$ . What is the area of the lune?



 Share Your Thoughts

Have some thoughts about the video? Want to discuss the problems on the Activity Sheet? Visit the MATHCOUNTS Facebook page or the Art of Problem Solving Online Community ([www.artofproblemsolving.com](http://www.artofproblemsolving.com)).