MATHCOUNTS® Minis
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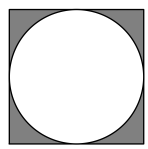
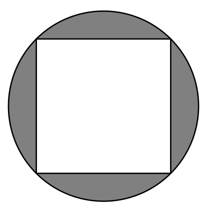
Warm-Up!

Try these problems before watching the lesson.

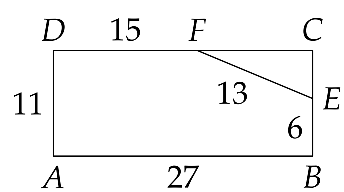
1. The square in the diagram below has side length 10 units. What is the area of the shaded region?



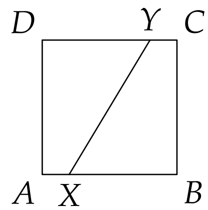
2. The square in the diagram below has side length 10 units. What is the area of the shaded region?



3. A triangular corner region is sliced off from a rectangular region as shown below. What is the area of the pentagonal region $ABEFD$ that remains?
Source: MATHCOUNTS



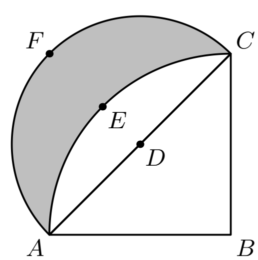
4. $ABCD$ is a square with side length 10. Point X is on side $\overline{AB}$ such that $AX = 2$. A line through X and the center of the square intersects side $\overline{CD}$ at point Y. Find DY and the area of $AXYD$.



The Problems

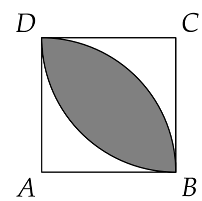
First Problem: What is the area of the quadrilateral with vertices $(0, 0)$, $(1, 2)$, $(3, 4)$ and $(6, 5)$?

Second Problem: In the figure shown, $\overset{\frown}{AEC}$ is drawn on isosceles right triangle ABC, with center B. $\overset{\frown}{AFC}$ is drawn with center D, which is the midpoint of hypotenuse AC. If the length of $\overline{AB}$ is 90 feet, what is the area of the shaded region?

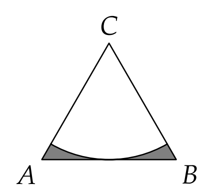


Follow-up Problems

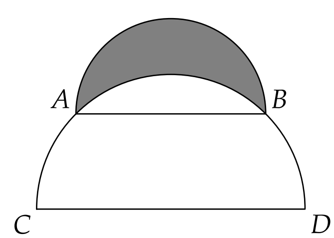
5. $ABCD$ below is a square with side length 8 units. One arc is centered at A and the other is centered at C. What is the area of the shaded region?



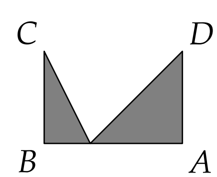
6. Triangle ABC below is equilateral. The arc is centered at point C and is tangent to $\overline{AB}$. If $AB = 6$, then what is the total area of the shaded regions?



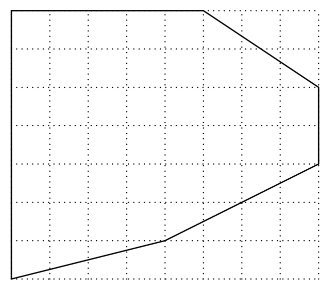
7. The shaded shape in the diagram below is called a lune. The two arcs in the diagram are semicircles with diameters $AB = 1$ and $CD = \sqrt{2}$. What is the area of the lune?



8. In the figure on the right, $AB = 12$ cm and $BC = AD = 8$ cm. We also have $\overline{BC} \perp \overline{AB}$ and $\overline{DA} \perp \overline{AB}$. How many square centimeters are shaded?



9. Tina wants to carpet a room that has the unusual shape shown on the right with solid lines. Each dotted square in the diagram has side length 5 feet. What is the area of Tina's carpet?



Wow! 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).