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# MATHCOUNTS

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■ Chapter Competition ■  
Practice Test 3  
Target Round Problems

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Name \_\_\_\_\_

**DO NOT BEGIN UNTIL YOU ARE  
INSTRUCTED TO DO SO.**

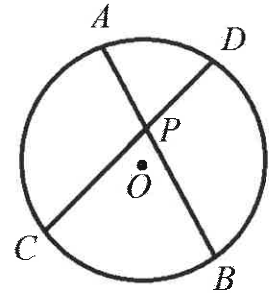
This round of the competition consists of eight problems, which will be presented in pairs. Work on one pair of problems will be completed and answers will be collected before the next pair is distributed. The time limit for each pair of problems is six minutes. The first pair of problems is on the other side of this sheet. When told to do so, turn the page over and begin working. Record your final answer in the designated space on the problem sheet. All answers must be complete, legible and simplified to lowest terms. This round assumes the use of calculators, and calculations may also be done on scratch paper, but no other aids are allowed.

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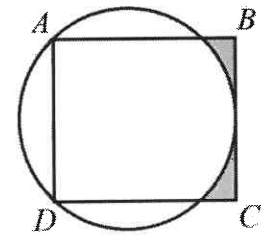
Total Correct	Scorer's Initials



3.  $AB$  and  $CD$  are two chords of the circle  $O$  intersecting at point  $P$ .  $\angle APD = 60^\circ$ . If the length of arc  $AD$  is  $3\pi$  and the length of arc  $BC$  is  $5\pi$ , find the circle's area. Express your answer in terms of  $\pi$ .



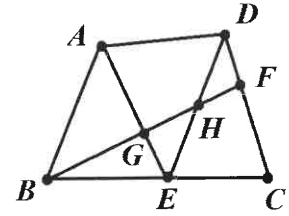
4. In the figure shown, a circle passes through two adjacent vertices of a rectangle  $ABCD$  (with  $AB = 3\sqrt{3}$ , and  $AD = 6$ ) and is tangent to the opposite side of the rectangle. What is the shaded area? Express your answer in terms of  $\pi$ .



5. In the arithmetic sequence  $a_n$ ,  $a_2 + a_5 + a_8 = 9$ , and  $a_2 \times a_5 \times a_8 = 15$ . Find the product of all the possible values of  $d$ , the common difference. Express your answer as a common fraction.

6. Find the sum of the greatest and the smallest possible values of  $|x-5| + |x-7|$  if  $0 \leq x \leq 8$ .

7. How many line segments can be counted in the figure? Note that a dot is an endpoint of segment.



8. Three distinct numbers are selected simultaneously and at random from the set  $\{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$ . What is the probability that their product is an even number? Express your answer as a common fraction.