

# MATHCOUNTS®

0  
1  
2  
3  
4

## 2022 CHAPTER COMPETITION Target Round Problems 1–8

Name \_\_\_\_\_

5  
6  
7  
8  
9

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

This section 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. This round assumes the use of calculators, and calculations also may be done on scratch paper, but no other aids are allowed. All answers must be complete, legible and simplified to lowest terms. Record only final answers in the blanks in the left-hand column of the problem sheets. If you complete the problems before time is called, use the time remaining to check your answers.



**2022 MATHCOUNTS**  
National Competition Sponsor



#### TITLE SPONSORS

Raytheon Technologies  
U.S. Department of Defense STEM

#### LEAD SPONSOR

Northrop Grumman Foundation

#### NATIONAL SPONSORS

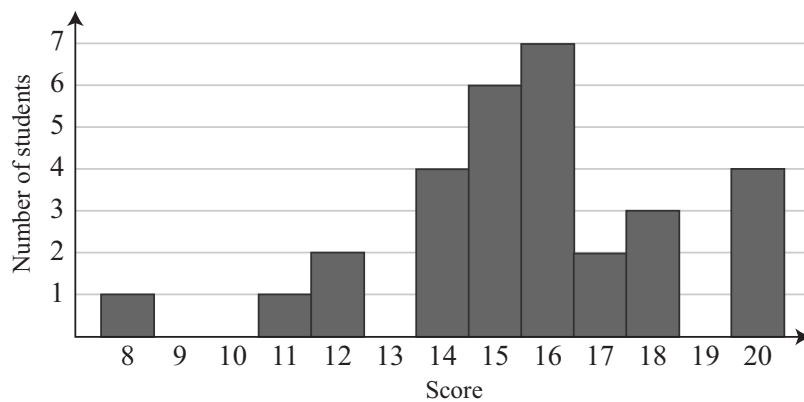
National Society of Professional Engineers  
3Mgives  
Texas Instruments Incorporated  
Art of Problem Solving

FOUNDING SPONSORS: National Society of Professional Engineers, National Council of Teachers of Mathematics and CNA Insurance

Copyright MATHCOUNTS, Inc. 2022. All rights reserved.

1. \_\_\_\_\_ Alec multiplied five of the six numbers 1, 4, 6, 9, 15 and 17 and obtained a product of 3240. Which of these six numbers was not included in the numbers he multiplied?

2. \_\_\_\_\_ points This histogram shows the numbers of students who received each score on a 20-point quiz. What was the mean quiz score? Express your answer as a decimal to the nearest tenth.

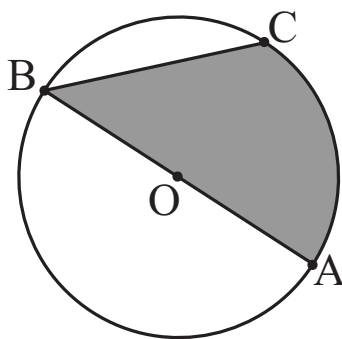


3. \_\_\_\_\_ seconds

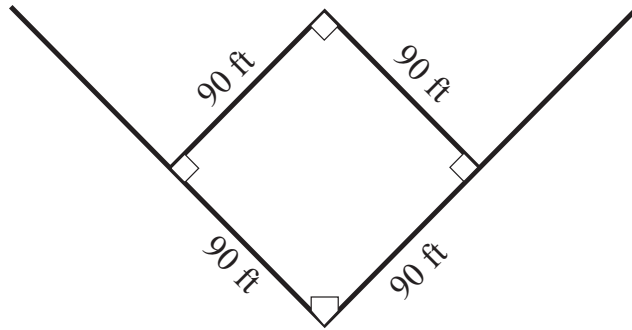
J. S. Bach's Prelude No. 2 in C Minor consists of 88 measures with each measure containing 16 notes. In a typical performance, 432 notes are played every minute. How many seconds does it take to perform the entire Prelude? Express your answer to the nearest second.

4. \_\_\_\_\_

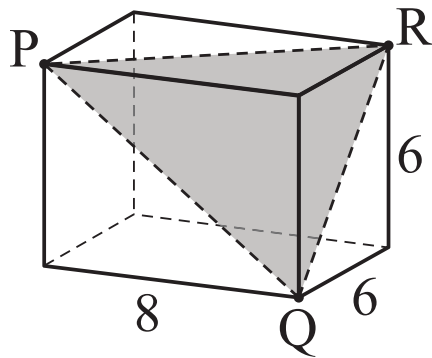
The figure shows circle O with diameter AB and inscribed angle ABC with  $AB = 8$  and  $BC = 4\sqrt{2}$ . When the area of the shaded region, in square units, is expressed in the form  $a + b\pi$ , what is the value of  $ab$ ?



5. \_\_\_\_\_ % A baseball diamond is a square with 90-foot sides. An acre of land is a region containing 43,560 square feet. What percent of an acre is enclosed within a baseball diamond? Express your answer as a decimal to the nearest tenth.



6. \_\_\_\_\_  $\text{units}^2$  The three-dimensional figure shown is a right rectangular prism. What is the area of  $\triangle PQR$ ? Express your answer in simplest radical form.



7. \_\_\_\_\_ books      Padraig is estimating the number of books in a library. The library has 8 floors, each of which has 22 large bookshelves and 14 small bookshelves. Each large bookshelf has 16 rows of books, and each small bookshelf has 4 rows of books. If each row of books contains 54 books on average, how many books are in the library? Express your answer to the nearest thousand.
8. \_\_\_\_\_      A machine randomly generates one of the nine numbers 1, 2, 3, ..., 9 with equal likelihood. What is the probability that when Tsuni uses this machine to generate four numbers their product is divisible by 14? Express your answer as a common fraction.