MATHCOUNTS®

2024 Chapter Competition

Team Round Problems 1–10

School _____

Team Members _____, Captain

_____

_____

_____

DO NOT BEGIN UNTIL YOU ARE INSTRUCTED TO DO SO.

This section of the competition consists of 10 problems which the team has 20 minutes to complete. Team members may work together in any way to solve the problems. Team members may talk to each other during this section of the competition. 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. The team captain must record the team's official answers on his/her own competition booklet, which is the only booklet that will be scored. If the team completes the problems before time is called, use the remaining time to check your answers.

Total Correct	Scorer's Initials

Title Sponsors

RTX

Department of Defense DoDSTEM Science · Technology · Engineering · Mathematics

Lead Sponsors

BAE SYSTEMS

NORTHROP GRUMMAN FOUNDATION

National Sponsors

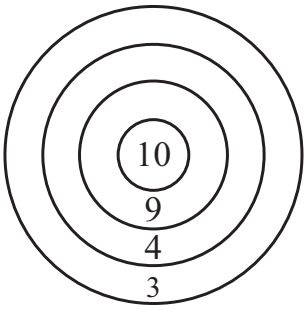
National Society of Professional Engineers ▪ 3M ▪ Texas Instruments, Inc. ▪ Art of Problem Solving

Founding Sponsors: National Society of Professional Engineers, National Council of Teachers of Mathematics and CNA Insurance

Copyright MATHCOUNTS, Inc. 2024. All rights reserved.

1. _____ darts

Four concentric circles form the dart board shown with regions worth 3, 4, 9 and 10 points. Assuming every dart hits the board in one of these regions, what is the least number of darts needed to score exactly 45 points?

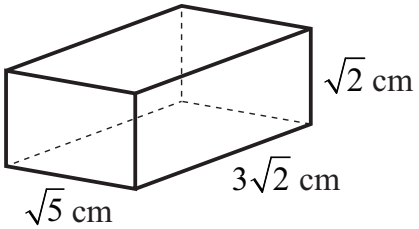


2. _____ years

The ages, in years, of a family of five are 40, 38, 13, 10, 7. In 5 years, what will be the mean of these family members' ages? Express your answer as a decimal to the nearest tenth.

3. _____ cm^2

What is the surface area of the rectangular prism shown? Express your answer as a decimal to the nearest tenth.



4. _____ computers

A shipment of 25 crates was delivered. In each crate there were 27 boxes, each containing 8 computers. Two computers were found to be defective when five boxes were opened. At this rate, what is the expected number of defective computers in the shipment?

5. _____ Golden Retrievers

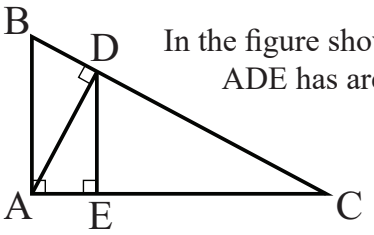
Jack brought a huge box of dog treats to share with the 20 total Golden Retrievers and Airedales at the dog park. Each Golden Retriever received 3 treats and each Airedale received 5 treats. If the Golden Retrievers received 20 more treats than the Airedales, how many Golden Retrievers were there?

Copyright MATHCOUNTS, Inc. 2023. All rights reserved. 2024 Chapter Team Round

6. _____ The function $S(n)$ finds the sum of the first n terms of an arithmetic sequence. If $S(n) = 3n^2 - 2n$, what is the value of the 2024th term of the arithmetic sequence?

7. _____ ordered triples How many ordered triples (a, b, c) of positive integers satisfy $ab + c = 12$?

8. _____ cm^2 In the figure shown, triangle ABD has area 18 cm^2 and triangle ADE has area 14 cm^2. What is the area of triangle CDE?



9. _____ chain segments The figure on the left shows a chain that consists of seven links. Two randomly selected links are cut open and removed from the chain. The figure on the right shows one possible outcome in which links 3 and 7 were removed, leaving the two separate chain segments shown. What is the expected number of separate chain segments that will remain after two randomly selected links are removed? Express your answer as a mixed number.

10. _____ cents Carolyn has 2024 pennies in a display case. First, she replaces every 8th penny with a nickel. Next, she replaces every 11th coin with a dime. Finally, she replaces every 23rd coin with a quarter. What is the new value of the coins in her display case in cents?

Copyright MATHCOUNTS, Inc. 2023. All rights reserved. 2024 Chapter Team Round