
MATHCOUNTS®

2017
■ School Competition ■
Target Round
Problems 1 & 2

Name _____

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.

Problem 1	Problem 2	Scorer's Initials

0
1
2
3
4
5
6
7
8
9



**2017 MATHCOUNTS
National Competition Sponsor**

NATIONAL SPONSORS

- Raytheon Company
- Northrop Grumman Foundation
- U.S. Department of Defense
- National Society of Professional Engineers
- CNA Foundation
- Phillips 66
- Texas Instruments Incorporated
- 3Mgives
- Art of Problem Solving
- NextThought

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

1. _____ Hal has a positive secret number. He performs a sequence of operations with his secret number. He doubles the number, subtracts 8, divides by 4, adds 2 and squares the result to get 25. What is Hal's secret number?

2. \$ _____ Toni goes to a department store and buys two shirts marked the same price. She pays full price for the first shirt but gets a 40% discount on the second shirt. If she pays a total of \$32.40 for the two shirts, how much did she pay for the second shirt?



MATHCOUNTS®

2017
■ School Competition ■
Target Round
Problems 3 & 4

Name _____

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

0
1
2
3
4
5
6
7
8
9

Problem 3	Problem 4	Scorer's Initials

NATIONAL SPONSORS

Raytheon Company
Northrop Grumman Foundation
U.S. Department of Defense
National Society of Professional Engineers
CNA Foundation
Phillips 66
Texas Instruments Incorporated
3Mgives
Art of Problem Solving
NextThought



**2017 MATHCOUNTS
National Competition Sponsor**

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

Copyright MATHCOUNTS, Inc. 2016. All rights reserved.

3. _____ The table lists the number of Wednesdays on which the Norton Middle School cafeteria served each of four different entrées and each of three different desserts during the previous school year. If the entrée and dessert served each Wednesday were selected independently and randomly, based on this data, what is the probability that the Norton Middle School cafeteria served pizza and lemon cake on the first Wednesday of the previous school year? Express your answer as common fraction.

Entree		Dessert	
Pizza	15	Lemon Cake	20
Chicken	8	Apple Pie	8
Fish & Chips	10	Brownies	12
Tacos	7		

4. _____ integers How many integers x , with $0 < x \leq 100$, are divisible by 2, 3 and 4?

MATHCOUNTS®

2017
■ School Competition ■
Target Round
Problems 5 & 6

Name _____

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

0
1
2
3
4
5
6
7
8
9

Problem 5	Problem 6	Scorer's Initials

NATIONAL SPONSORS

Raytheon Company
Northrop Grumman Foundation
U.S. Department of Defense
National Society of Professional Engineers
CNA Foundation
Phillips 66
Texas Instruments Incorporated
3Mgives
Art of Problem Solving
NextThought



**2017 MATHCOUNTS
National Competition Sponsor**

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

Copyright MATHCOUNTS, Inc. 2016. All rights reserved.

5. _____ Two circles, each of radius 5 units, have centers at the origin and at $(7, 7)$, respectively. What is the y -intercept of the line that contains their common chord?

6. _____ ways How many ways are there to choose positive integers a , b and c , not necessarily distinct, so that $a + b < c$ and $c \leq 5$?

MATHCOUNTS®

2017
■ School Competition ■
Target Round
Problems 7 & 8

Name _____

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

Problem 7	Problem 8	Scorer's Initials

0
1
2
3
4
5
6
7
8
9



**2017 MATHCOUNTS
National Competition Sponsor**

NATIONAL SPONSORS

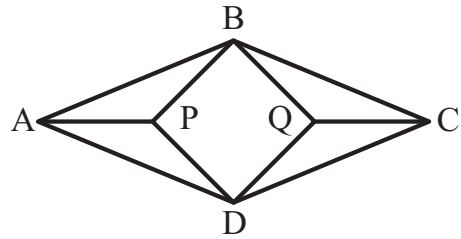
- Raytheon Company
- Northrop Grumman Foundation
- U.S. Department of Defense
- National Society of Professional Engineers
- CNA Foundation
- Phillips 66
- Texas Instruments Incorporated
- 3Mgives
- Art of Problem Solving
- NextThought

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

Copyright MATHCOUNTS, Inc. 2016. All rights reserved.

7. _____ degrees

The figure shows points P and Q inside rhombus ABCD so that segments AP, BP, BQ, CQ, DQ and DP are all congruent. If the measure of angle BAD is 40° , what is the degree measure of angle PDQ?



8. _____ %

A company sells popcorn in cylindrical canisters. Marketing indicates that wider canisters will increase sales. If the diameter of the canister is increased by 27% while keeping the volume of the canister the same, by what percent must the height be decreased? Express your answer to the nearest whole number.

