

MATHCOUNTS®

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2021 CHAPTER COMPETITION Target Round Problems 1–8

Name _____

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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.



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1. _____ piques If there are 0.624782 lugs in a pique, then how many piques are in 200 lugs?
Express your answer to the nearest integer.

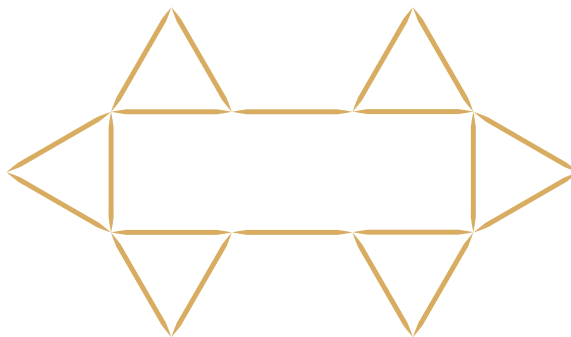
2. _____ Consecutive integers are arranged in three columns in the pattern shown.
What number will appear in column C in row 22?

| A | B | C | |
|----------|----------|----------|--------------|
| 1 | 2 | 3 | Row 1 |
| 6 | 5 | 4 | Row 2 |
| 7 | 8 | 9 | Row 3 |
| 12 | 11 | 10 | Row 4 |
| 13 | ⋮ | ⋮ | Row 5 |
| ⋮ | | | |

3. _____ slices Jamie makes 120 slices of toast and puts at most one spread (jam, butter or avocado) on each slice. She puts jam on $\frac{1}{3}$ of the slices, butter on 15 of the slices and avocado on 50% of the slices. How many slices of Jamie's toast have no spread?

4. _____ units Segment AB is 2808 units long. Point X is the midpoint of segment AB. Point R is $\frac{3}{4}$ of the way from X to B. Point S is $\frac{5}{9}$ of the way from X to R. How many units long is segment RS?

5. _____ cm^2 Twenty toothpicks, each 6 cm long, form a figure consisting of six equilateral triangles and a rectangle as shown. What is the total area of the figure? Express your answer as a decimal to the nearest hundredth.



6. _____ moves There are 10 coins on a table heads side up. Noah wants them all to be tails side up, but with each move, he must turn over exactly 6 coins. What is the fewest moves he can take so that he ends up with all of the coins tails side up?

7. _____ Suppose that n is a positive integer for which the product $35n$ is divisible by 60. What is the least possible value of n ?

8. _____ cm Tim has a collection of square tiles of various sizes, each of which has an etched quarter circle with radius equal to the side length of the tile. Tim arranges eight tiles as shown. If the two smallest tiles each have side length 10 cm, what is the length of the resulting spiral formed by the tiles' etchings? Express your answer in terms of π .

