
MATHCOUNTS®

2020

■ **School Competition** ■
Team Round
Problems 1–10

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

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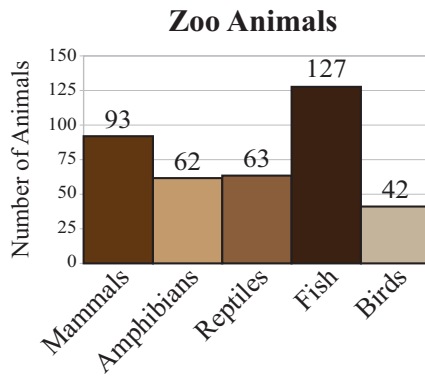
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1. _____ %



William counted all the animals he saw at the zoo. This graph shows the data he collected. Based on this, what percentage of the animals that William saw are mammals? Express your answer to the nearest hundredth.

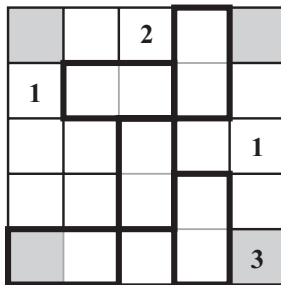
2. _____ ways

How many ways are there to arrange the four integers 1, 2, 3 and 4 in a row so that no two adjacent numbers have a sum of 5?

3. _____

There are 93 sixth graders and 108 seventh graders entering a raffle. In each grade, the number of dog owners is twice the number of students who do not own a dog. What is the probability that a seventh grader who does not own a dog wins the raffle? Express your answer as a common fraction.

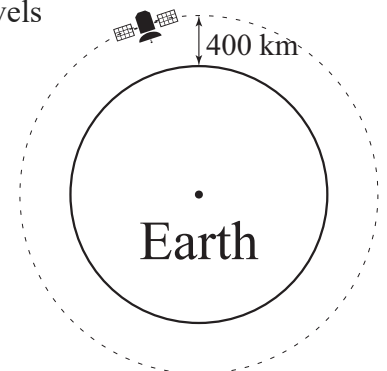
4. _____



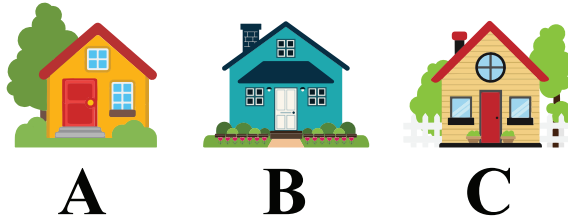
In the 5×5 grid shown, each row and each column is to contain the integers 1 through 5 exactly once with one integer per cell. The sum of the two integers in each outlined pair of cells is 5. What is the product of the integers in the four corner cells that are shaded?

5. _____ minutes

A satellite, located 400 km above Earth's surface, travels at a speed of 28,000 km/h. For simplicity, assume that Earth is a perfect sphere with circumference 40,075 km. How many minutes does it take the satellite to orbit Earth one time? Express your answer as a decimal to the nearest tenth.



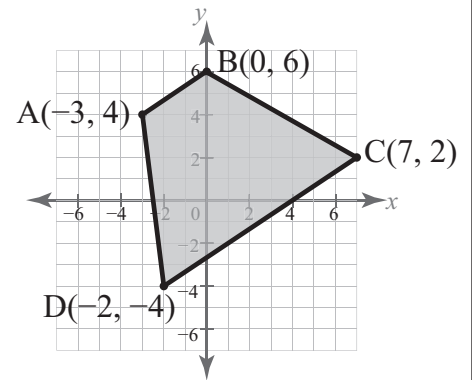
6. _____ Three children each live in one of three houses, equally spaced and arranged as shown. Each child is equally likely to live in any of the houses, and it is possible that a house has no children living in it. All three children will play in the house that minimizes the total distance they have to travel. What is the probability that they will play in house B? Express your answer as a common fraction.



7. _____ integers How many distinct positive integers n can be expressed as $n = ab$ for integers such that $1 \leq a \leq 10$ and $1 \leq b \leq 10$?

8. _____ ft^2
-
- In the figure, square ABCD has side length 6 feet, and E is a point in the exterior of the square such that triangle ADE is equilateral. How many square feet are in the area of shaded triangle BEC? Express your answer as a decimal to the nearest tenth.

9. _____ units^2 What is the area of the quadrilateral ABCD as shown?



10. _____ integers How many of the first million positive integers share no common factors greater than 1 with 2020?