

Unless otherwise indicated, leave each Target answer in an exact and simplified form.

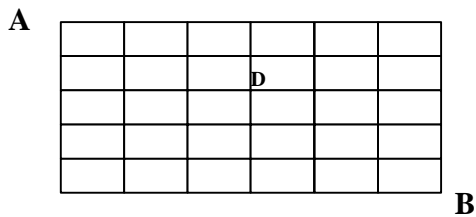
Great Plains Math League – Target Round 10501.1

1. Vivek is trying to transfer into Cabot House along with 6 other people but there are only 5 available spaces. If the spaces are assigned randomly, what is the probability that Vivek gets into Cabot house?
2. Will was forced to wear an eye patch over his right eye. As a mathematician this caused problems because he was only able to see the left half of numbers. Given any number with $2k$ digits, he assumes that the rightmost k digits are half of 10^k . If the two unit digits in the 2 by 2 multiplication problem below are selected at random with replacement, what is the probability that the correct answer is within 10% of Will's estimate?

$$\begin{array}{r} 2 \ _ \\ \times 6 \ _ \\ \hline \end{array}$$

Great Plains Math League – Target Round 10501.2

3. Josh currently has a problem that when attempting to walk straight forward when crossing the street, he walks straight but at a 30° angle to the path that he is attempting to travel. Given that he travels at 10 ft/s and that it takes him 3 seconds to cross the street, what is the length in feet of the path he was attempting to take?
4. Liz is wandering New York at 5 am. She wants to travel from point A to point B on the 6 by 5 grid below, stopping for coffee and a bagel at Dilly's Deli at D. However, she can only travel down and to the right on the grid. How many different paths can she take from A to B that pass through the intersection near D?



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Great Plains Math League – Target Round 10501.3

5. Ariel has n bottles of Perrier. When he packs all n bottles in boxes of 10, he has 3 bottles left over. When he packs all n bottles in boxes of 12, he has 11 bottles left over. Given that $30 < n < 100$, what is n ?
6. Kevin plans to take five classes in the coming semester. For each of the five classes, let p be the probability that Kevin has determined that class and q be the probability he has not. Let n be the expected value of the number of classes that Kevin has determined. Given that $6p+4=6(q+1)$, what is n ?

Great Plains Math League – Target Round 10501.4

7. Amit does not go out on days that it rains, snows, or have a gusty wind. It snows 25% of the time and 20% of these times the wind gusts. It rains 20% of the time and 10% of these times, the wind gusts. When there is no precipitation, the wind gusts 40% of the time. Given that it never rains and snows at the same time, what percent of the time does the wind gust?
8. Hans is trying to decide whether he should sleep, play viola, or watch a movie today, but since he is a waffler he cannot make the decision himself. Therefore, Hans will decide by rolling a standard 6-sided die three times and adding the numbers up. He divides the possible sums (3-18) into 3 groups that have equal probability of occurring. Given the group of possible sums representing sleep are 5, 6, 9, 12, 16; what is the smallest difference possible between the total sum of the numbers representing playing viola and watching a movie?