Name: _____ Score: _____ / 45

Grade: _____ Team: _____

This is a round consisting of **15 problems** to be done in **25 minutes**. Problems are in roughly ascending difficulty. **Each question will be worth 3 points.** Any figures or diagrams in the test may not be to scale.

No aids are permitted aside from pencils, pens, and provided scratch paper. In particular, no calculators or other computers are permitted. Communication with other people will result in a zero.

Record your answers in the box corresponding to the correct problem. Only answers printed in the boxes below will be scored.

Your Answers

1.	6.	11.
2.	7.	12.
3.	8.	13.
4.	9.	14.
5.	10.	15.

1. Denis buys 3 apples with 4 oranges, and 6 oranges with 2 kiwis. How many apples can he buy with 8 kiwis?

2. Let $S = -10x - 8x - 6x - 4x - 2x$ and $T = x + 5x + 9x + 13x + 17x$. If $x = 17$, find $2S + T$.

3. For a typical math competition with 100 contestants, 24 pizzas were bought. Turns out, the amount of pizza was enough to feed 140 contestants. What was the least number of pizzas needed for the 100 contestants?

4. Let S be the set of all intersection points between two parallel lines and a rectangle. What is the largest possible value of S?

5. A 5-digit integer is created with the digits $2, 3, 4, 5,$ and 7. What is the probability that it is odd?

6. $\frac{x}{11}$ is between $\frac{13}{16}$ and $\frac{5}{6}$. Find x.

7. Before WinMaC, $\frac{2}{5}$ of contestants answered "Yes" to "Is challenging math doable, fun, and rewarding?" and the rest answered "No." After WinMaC, 40% of "No" voters changed their minds. Some of the "Yes" voters also changed their minds. If after the competition $\frac{3}{5}$ answered "Yes," what percent of all contestants did not change their answers?

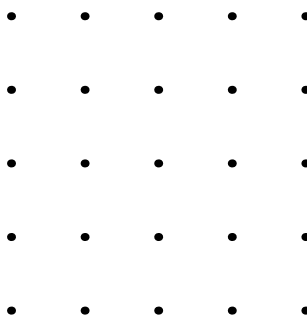8. How many numbers less than 30 have a prime number of factors?

9. A piece of paper is shaped like an equilateral triangle with an area of 16 square units and vertices A, B, and C. I fold the triangle two times. First, I fold the paper so that B and C touch, creating a right triangle. Then, I fold along the line that intersects the midpoint of AC and is parallel to the shorter leg of the right triangle. What is the area of the new shape, in square units?

10. How many ways are there to order 8 people in a circular seating pattern so that Mark and Kevin don't sit next to each other?

11. $a^2 + \frac{ab}{4} = 27$ and $\frac{b}{8} + 33 = 30$. Solve for all possible ordered pairs (a, b).

12. We have the following sequence: $-2, 10, 40, 88, ..., 340, a$. Based on the pattern, what is a?

13. How many rectangles have their 4 vertices on a 5 by 5 grid?

$$
\begin{matrix}
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\bullet & \bullet & \bullet & \bullet & \bullet \\
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\bullet & \bullet & \bullet & \bullet & \bullet
\end{matrix}
$$

14. Three friends play a card game with five cards numbered 1 to 5. After the deck is dealt, each person can have up to 5 cards. How many different hands can the first friend get?

15. When $54, 145$, and 28 are divided by a positive integer a, with $a > 1$, all three numbers have a remainder b. Find $a \cdot b$.