$$B > \frac{1}{n} \sum_{i=1}^{n} x_i$$

(Be greater than average)

Geometry – 7th Grade

1. **2 points:** What is the area of the polygon whose vertices are at the points with coordinates $(0,0)$, $(0,4)$, $(4,4)$, $(10,0)$, and $(4,-3)$?

2. **2 points:** What angle do the minute and second hand of a standard analogue clock form at 4:15? **Express your answer as a decimal.**

3. **2 points:** How many unique diagonals does a regular 9-sided polygon have?

4. **3 points:** Suppose that the longer leg of a right triangle is twice the length of the shorter leg. If the length of the hypotenuse is 15, what is the length of the shortest side of the triangle? **Express your answer to the nearest hundredth.**

5. **3 points:** Suppose that 64 unit cubes are used to make a larger cube with a side length of 4, and then the unit cube at each of the vertices is removed. What is the surface area of the resulting figure?

6. **3 points:** A roller paint brush is cylindrical shaped and can paint only along the sides (not the top or bottom). The roller brush that you are using has a radius of 3 inches and a length of 12 inches. Assuming that you do not overlap any paint and the brush does not rotate when you lift it up to move it, how many rotations will it take to paint a board that has a length of 36π inches and height of 3 feet?

7. **3 points:** A sphere of radius 3 shares the center of a larger sphere. If the volume of the space between the two spheres is $\dfrac{171\pi}{2}$, what is the radius of the larger sphere? **Express your answer as a decimal.**

8. **4 points:** Two congruent circles are drawn such that they intersect and share a common radius that has a length of 10. If a triangle were to be formed using the centers of the two circles as two of the vertices and one of the two intersection points as the third vertex, what is the area of the triangle? **Express your answer to the nearest tenth.**

9. **4 points:** If the line segment with endpoints at $(2,1)$ and $(7,8)$ is rotated 360 degrees about its endpoint $(2,1)$, what is the area of the resulting region? **Express your answer to the nearest whole square unit.**

10. **4 points:** The areas of four rectangular regions in the quadrilateral shown below, listed clockwise from the top left, are 15, 60, 180, and 45. If the side lengths of each rectangular region are integers, what is the smallest possible perimeter of the quadrilateral?