

Math Awareness Month Competition

Department of Mathematics - University of Kansas

Sample Problems for 7th-9th Grade Examination

DIRECTIONS: [40 Minutes - 5 Questions] Start each new problem on a separate page. **Show your work!** Answers must be **exact**. You are allowed to use a calculator. You are not allowed to borrow or interchange calculators during the test.

1. Mary is 24 years old. She is twice as old as Ann was when Mary was as old as Ann is now. How old is Ann?

2. A circle of diameter 1 is inscribed in a square, dividing it into five regions: the region inside the circle, and a region at each corner. Find the diameter of a circle inscribed in in one of the corner regions.

3. Arrange these numbers in increasing order:

1^{888} 2^{777} 3^{666} 4^{555} 6^{333} 7^{222} 8^{111}

4. What is the largest product you can get by multiplying together a bunch of positive integers (whole numbers) that add up to 23? (The numbers do not have to be distinct.)

5. A $9' \times 12'$ rug has a $1' \times 8'$ hole in the middle (see figure), leaving it with an area of 100 square feet. Show, by drawing cut lines on the figure below, how the rug can be cut into just two pieces, which can be arranged to cover the floor of a $10' \times 10'$ room.

