

NASSAU COUNTY INTERSCHOLASTIC MATHEMATICS LEAGUE

2007 – 2008

No Calculators Allowed

Contest #1

Answers must be in simplest exact terms unless otherwise specified.

Problems 1-2. 10 minutes

1. When a two-digit number is divided by the sum of its digits what is the greatest possible remainder?

2. If the length of one side of a rectangle is increased by 15%, by what percent must the length of an adjacent side of the rectangle be decreased so that the area of the new rectangle will be exactly 8% less than the area of the original rectangle?

Problems 3-4. 10 minutes

3. At what time of the day between noon and 1 pm will the hour and minute hands of a standard 12-hour clock first make an angle of 44° ?

4. In a circle of diameter 24 cm, minor arc \widehat{AB} measures 8π cm. Compute the number of centimeters in the length of chord AB.

Problems 5-6. 10 minutes

5. An urn contains only red marbles and blue marbles of equal size and texture. The number of red marbles is 11 more than the number of blue marbles. If two marbles are drawn at random without replacement, the probability that both marbles are red is 12 times the probability that both marbles are blue. Before any marbles were drawn, what was the total number of red marbles in the urn?

6. The infinitely continued nested radical $\sqrt{29 + \sqrt{29 + \sqrt{29 + \sqrt{29 + \dots}}}}$ can be expressed in simplest radical form as $\frac{a\sqrt{b} + c}{2}$. Give the ordered triple (a, b, c).