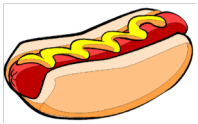
2nd Rochester Area Math Competition 2020

12 September 2020

Elementary II Individual

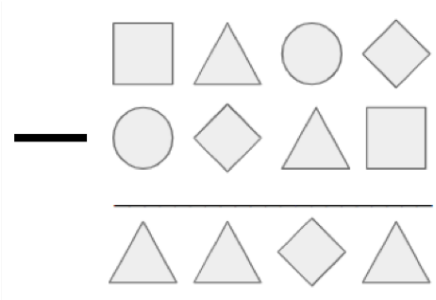
1. Bob's Hot Dog Stand sells hotdogs for \$3 and sodas for \$1. Jane spent exactly \$55 at Bob's Hotdog Stand and bought 25 items (hotdogs and sodas combined). How many sodas did she buy?



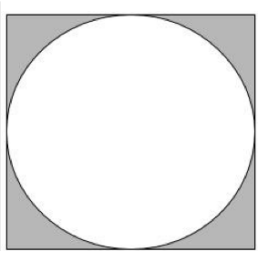
2. If the degree measures of a triangle have the ratio 1:2:3, what is the degree measure of the second largest angle in the triangle?

3. For the first 20 odd numbers, let the simplified ratio of the number of primes to the number of perfect squares be $\frac{m}{n}$, where m and n are positive integers that share no common divisors other than 1. What is $m+n$?

4. Each of the shapes shown in the subtraction problem below represents a different digit between 0 and 9, inclusive. If the square represents 7, what digit does the circle represent?

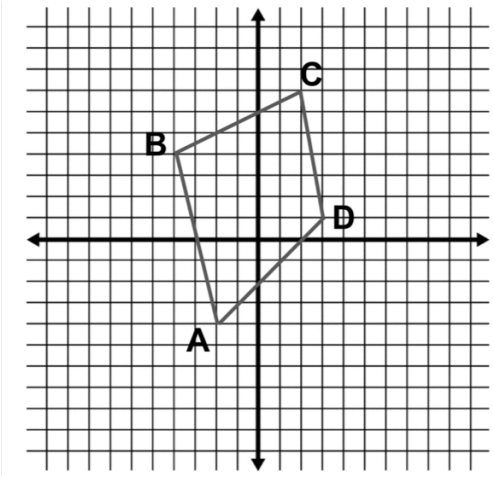


5. A square is circumscribed around a circle with circumference 10π as shown in the diagram. If the area of the shaded region is $a - b\pi$, find $a + b$.



6. John the repairman has to make repairs in 6 houses today. He can give 3 houses a special 10% discount. In how many ways can he give out those discounts, if the order in which he gives out those discounts doesn't matter?

7. In the coordinate grid below, the marks on each axis are spaced 1 unit apart. Let X be the area of quadrilateral $ABCD$. Find the largest integer that is less than X.



8. Aurelia runs down a path at a constant speed of 15 km/h (kilometers per hour). She runs back down the same path at a constant speed of 10 km/h. The path is 1 kilometer long. What is Aurelia's average running rate in meters per minute for those two runs?

9. A fair six-sided die whose faces are numbered $1-6$ is rolled three times. Let the probability that the product of the three rolls is greater than 8 be expressed as a fraction in the simplest form, $\frac{m}{n}$, where m and n are positive integers who share no common divisors other than 1. What is $m+n$?

10. How many integers between 1 and 1000 inclusive do not contain the digits 3 or 7?