2010 Rocket City Junior Math Mania
Algebra Test – 4th Grade

1. Evaluate: $7 + 8 \times 9 - (2 \times 3 - 4)^2$
2. Evaluate $3752 \div 8$.
3. What is the sum of the number of vertices on a rhombus, the number of days in April, and the number of inches in a yard?
4. Two new exhibits at the zoo contain penguins and zebras. If there are 19 heads and 44 feet, how many penguins are there?
5. If 12 kilograms of sugar can be bought for 6 dollars, how many dollars would twenty kilograms of sugar cost?
6. If $y = x^2 + x - 12$, then find the value of y when x = 4.
7. Evaluate: $1\frac{1}{14} \times 1\frac{1}{20}$
8. Evaluate $4 \times 5 - 6 \times 2$.
9. What is ½ of 1/3 of 12?
10. Find the value of x if: $2x - 11 = 17$

Tie Breakers:

1. Find the value of a if ½ a + 17 = x + 12.
2. What are the prime factors of 375?

2010 Rocket City Junior Math Mania
Geometry Test – 4th Grade

Please **do <u>not</u> include units** in your answers.

If a problem uses π, please leave your answer in terms of π instead of using an approximation. (Example: the area of a circle with radius 5 is 25π.)

1. What is the volume, in cubic meters, of a right rectangular pyramid with base edges measuring 4 m and 8 m and a height of 6 m?

2. What is the area, in square centimeters, of a rectangle with sides measuring 9 cm and 12 cm?

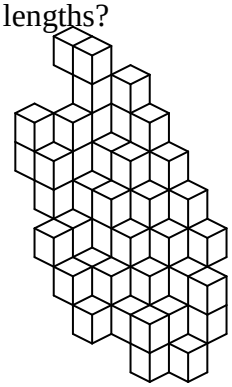
3. How many diagonals can be drawn in a regular hexagon?

4. How many sides does a nonagon have?

5. What is the circumference, in centimeters, of a circle with a diameter of 19 cm?

6. What name describes a triangle with three sides of different lengths?

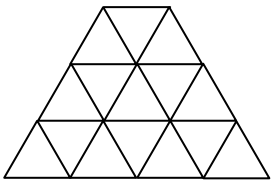
7. What is the minimum number of unit cubes necessary to create the following structure, if unit cubes must be glued together face-to-face? (You must count hidden squares if they are necessary for holding the structure together.)



8. What is the measure, in degrees, of the angle supplementary to the angle complementary to $60°$?

9. A triangle has two sides measuring 8 cm and 13 cm. What is the smallest possible integer length, in centimeters, of the third side?

10. How many equilateral triangles of any size are shown in the given figure?



Tie Breakers:

1. What is the perimeter of an octagon if the length of each side is 2010?

2. What is the surface area, in square meters, of a right circular cylinder with a base radius of 8 m and a height of 12 m?

2010 Rocket City Junior Math Mania
Geometry Test – 4th Grade

2010 Rocket City Junior Math Mania
Potpourri Test – 4th Grade

1. What is the sum of the eight smallest positive perfect squares?

2. What is the missing term of the sequence 3, 1, 5, 2, 7, 4, 9, 8, __, 16, 13, …?

3. In a line, Oliver is somewhere ahead of Percy, Quincy is immediately behind Rachel, and Shelley is somewhere behind Terrance. If Oliver is immediately ahead of Terrance, and Quincy and Percy are somewhere behind Shelley, how many arrangements of these six are possible?

4. What is the mean of the data set {3, 4, 3, 15, 10}?

5. What value(s) of b satisfy $3b+7=5b-15$?

6. How many of the following numbers are divisible by 4?
   24, 87, 234, 518, 972, 3103, 6342, 8296, 11234, 40036, 78901, 123456

7. Evaluate: $\frac{2}{3}\times\frac{6}{5}$

8. If Set M is the set of one-digit positive integers and Set N is the set of one-digit prime numbers, how many numbers are in Set M and Set N?

9. What is the least common multiple of 21 and 35?

10. In a survey of 382 math club members, 114 enjoyed arithmetic, 203 enjoyed algebra, and 258 enjoyed geometry. If 86 enjoyed both arithmetic and algebra, 92 enjoyed both arithmetic and geometry, 135 enjoyed both algebra and geometry, and 73 enjoyed all three, how many of the surveyed math club members enjoyed none of these subjects?

Tiebreakers:

1. In the cryptarithm below where each instance of a letter represents the same digit (0-9) and no two letters represent the same digit, what is the value of the three-digit number ABC?

   AA + BA = C2B

2. How many even numbers are there between 197 and 353?

2010 Rocket City Junior Math Mania
Probability Test – 4th Grade

1. When two fair six-sided dice are rolled, what is the probability that the sum of the numbers on their upper faces is five?

2. When one card is drawn from a standard 52-card deck, what is the probability that it is the Jack, Queen, or King of Spades?

3. When a single fair six-sided die is rolled, what is the probability that the number on its upper face is greater than two?

4. When a fair coin is flipped three times, what is the probability that the third flip is heads?

5. Of the 35 students in Mr. Smith's class, eight are in math club and eleven are in game club. If 20 students are in neither club, how many students are in both clubs?

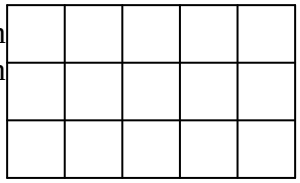
6. When a card is drawn from a standard 52-card deck, what is the probability that it is a six or a red card?

7. In how many ways can the letters in the word "DIVISION" be arranged?

8. A bag contains three red, six white, and twelve blue marbles. When one marble is drawn from the bag, what is the probability that it is red?

9. Four pieces of candy are to be distributed among six people. In how many ways can this be done, if at least two people must receive candy?

10. In the array of unit squares to the right, how many paths are there from the upper left corner to the lower right corner going only right or down along the gridlines?



Tiebreaker:

1. If a fair coin is flipped, and a fair, six sided die is rolled, what is the probability the result is tails and a number greater than 4?