2007 Rocket City Junior Math Mania
Algebra Test – 4th Grade

1. Two numbers sum to 28 and differ by 8. What is the value of the smaller number?

2. Evaluate:
$$\begin{array}{r} 232 \\ \times 789 \\ \hline \end{array}$$

3. What is 24% of the sum of $2\frac{1}{5}$ and 1.05, expressed as a reduced fraction?

4. Evaluate: $153^2 - 147^2$

5. A collection of triangles and pentagons contains 40 shapes having a total of 138 sides. How many pentagons are there?

6. What value(s) of z satisfy $4z + 7 = 9z - 48$?

7. If I drive 80 km at 20 kmph and then 60 km at 30 kmph, how fast must I drive the remaining 40 km, in kilometers per hour, to average 22.5 kmph for the entire trip?

8. What is the distance between the points $(3, 4)$ and $(15, -5)$?

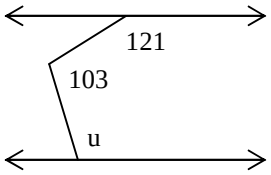
9. Evaluate: $(9 - 6 \div 2)^2 + 8 \div 4$

10. Evaluate:
$$\begin{array}{r} 47 \\ 86 \\ +29 \\ \hline \end{array}$$

2007 Rocket City Junior Math Mania
Geometry Test – 4th Grade

1. What is the surface area, in square centimeters, of a cube with edges measuring 9 cm?

2. In the figure, the upper and lower lines are parallel and all angle measures are given in degrees. What is the value of u?



3. What is the area, in square centimeters, of a circle with a circumference measuring 24® cm?

4. A non-degenerate triangle has two sides measuring 11 and 15 cm. How many integers can be the length of the third side in centimeters?

5. An isosceles triangle has a vertex angle measuring $104°$. What is the measure, in degrees, of one of its base angles?

6. What is the volume, in cubic centimeters, of a right rectangular prism (a box) with edges measuring 6, 8, and 11 cm?

7. What is the largest number of regions into which five lines can divide a plane?

8. A right triangle has a hypotenuse measuring 26 cm and a leg measuring 10 cm. What is the length of the other leg, in centimeters?

9. What is the area, in square centimeters, of a circle circumscribed about an equilateral triangle with sides measuring 6 cm?

10. A rectangle has an area of 308 cm^2 and a perimeter of 72 cm. What is the length, in centimeters, of a longer side of the rectangle?

2007 Rocket City Junior Math Mania
Potpourri Test – 4th Grade

1. How many integers between 40 and 60 are prime?

2. What is the mode of the data set 1, 2, 3, 4, 5, 1, 3, 5, 1, 4, 1, 5 ?

3. What is the sixth term of an arithmetic sequence with a first term of 14 and a common difference of 9?

4. When Anna, Ben, Cade, and Devon stand in a line, Cade is in front of Devon, Ben will not stand adjacent to Anna, Ben is in front of Devon and Anna is behind Cade. If Anna is not last in line, who is first in line?

5. What is the largest integer that can be generated using the digits 3, 4, 5, and 6 exactly once each and the operations +, $\times$, and $\div$ exactly once each. No parentheses may be used. E.g. $3+4\times5\div6=3+\frac{20}{6}=3+\frac{10}{3}=\frac{19}{3}$ which is not an integer so cannot be the answer to this problem.

6. What is the least common multiple of 280 and 126?

7. If $A=\{2,4,6,8,10\}$ and $B=\{2,3,4,5,6\}$, what is $A\cap B$?

8. Express the base eight number 1234_8 as a base ten number.

9. A collection of 23 coins (each of which is either a quarter or a dime) is worth \$4.55. How many quarters are in the collection?

10. What is the perimeter, in centimeters, of a rectangle with an area of 128 cm^2 and a side measuring 8 cm?

2007 Rocket City Junior Math Mania
Probability Test – 4th Grade

1. A bag of marbles contains four white marbles, five black marbles, and six grey marbles. What is the probability that a marble drawn from the bag is grey?

2. In how many ways can a President and Vice-President be elected from a field of six candidates?

3. The probability that Anne is driving her car is $\frac{1}{4}$, while the probability that she is talking on her cell phone is $\frac{1}{3}$. If these are independent events, what is the probability that she is driving her car while talking on her cell phone?

4. When two standard six-sided dice are rolled, what is the probability that the sum of the numbers shown on their top faces is nine?

5. When five coins are flipped, what is the probability that exactly two of them are heads?

6. When two cards are drawn from a standard 52-card deck, what is the probability that they are of different suits?

7. Two otherwise standard six-sided dice each have an asterisk instead of a six. The asterisk acts as a wildcard, so that two dice match if they show the same number or at least one shows an asterisk. When the two dice are rolled, what is the probability that the two dice match?

8. A trusted friend flips two coins and tells you that she didn't get two heads. What is the probability that she didn't get two tails?

9. What is the probability that a card drawn from a standard 52-card deck is a spade or a nine (or both)?

10. A bag contains three yellow marbles, two blue marbles, and one green marble. If one marble is removed from the bag and hidden, what is the probability that the next marble drawn is blue?