2009 Rocket City Junior Math Mania
Algebra Test – 5th Grade

1. The Australian exhibit at the zoo includes both kangaroos (two legs) and dingos (four legs). If there are 19 heads and 68 legs, how many kangaroos are there?

2. If I start with eight and multiply by two seven times, what do I get?

3. Evaluate: $6\overline{)132}$

4. Evaluate: $\frac{4}{21} \div \frac{6}{35}$

5. Evaluate: $8 + 2 \times (9 - 6 \div 3) + 7^2$

6. What is the sum of the number of feet in a mile, the number of sides on an octagon, and the number of minutes in an hour?

7. Express the number 987 in scientific notation.

8. Evaluate: $137^2 - 123^2$

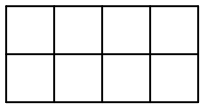
9. Express in simplest radical form: $\sqrt{63}$

10. When six liters of a 66% acid solution are mixed with nine liters of a 21% acid solution, what percent of the resulting solution is acid?

2009 Middlementary Math Bonanza
Geometry Test – 5th Grade

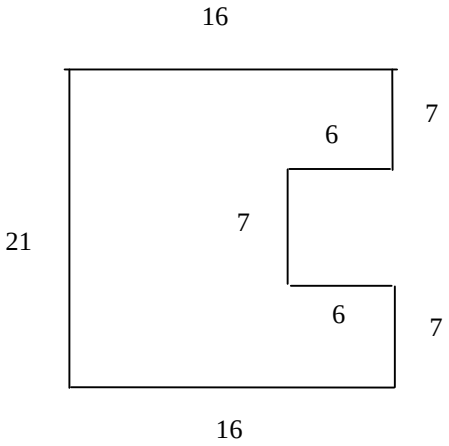
1. What is the perimeter, in centimeters, of a rectangle with sides measuring 7 and 12 cm?

2. How many rectangles are there in the figure to the right?



3. What is the area, in square centimeters, of a circle with a radius of 9 cm?

4. What is the area, of the figure shown:



5. What is the hypotenuse, in centimeters, of a right triangle with legs measuring 9 and 12 cm?

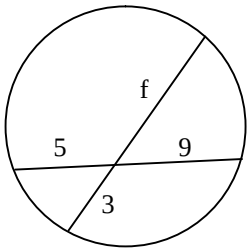
6. If two legs of a triangle measure 31 and 21 cm, how many integers could be the length of the third side in centimeters?

7. How many diagonals can be drawn in a convex 11-gon?

8. A cow is tied to an outside corner of a rectangular barn with sides measuring 30 by 50 m. If the cow's tether is 40 meters long, what is the area, in square meters, of the region the cow can graze?

9. What is the volume, in cubic centimeters, of a right circular cylinder with a base radius of 4 cm and a height of 5 cm?

10. In the figure shown, what is the value of *f*?



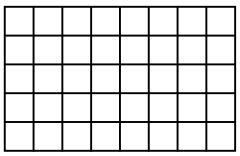
2009 Rocket City Junior Math Mania
Potpourri Test – 5th Grade

1. What is the smallest integer value of j for which $h(j) = 1000 - 2^{j+1}$ is less than 700?

2. List the letters A, B, C, and D in increasing order if $A = 2^5$, $B = \sqrt{576}$, $C = 17 \times 21 - 321$, $D = 14 + 156 \div 12$.

3. What is the sum of the fifteen smallest positive perfect squares?

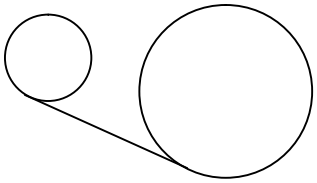
4. How many squares of any size are there in the grid of unit squares to the right?



5. Five students line up to buy lunch. If Andy is directly behind Carol, Dirk is somewhere in front of Bernice, and Emily is in the center, how many arrangements are possible?

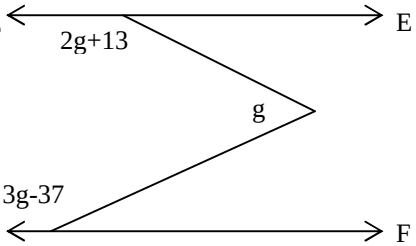
6. If four mice can eat six wheels of cheese in nine days, how many days would it take three mice to eat eight wheels of cheese?

7. Two circles with radii of 4 and 14 cm have their centers 26 cm apart. What is the length, in centimeters, of their common external tangent?



8. My piggy bank contains fifteen coins and is worth $1.21. If each coin is either a penny, nickel, or dime, how many nickels are in the piggy bank?

9. In the figure shown, where lines E and F are parallel and angle measures are given in degrees, what is the value of g?



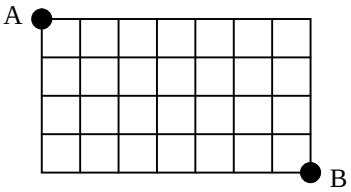
10. In the cryptarithm below, each instance of a letter represents the same digit (0-9) and different letters represent different digits (e.g. if one A is an 8, all A's are 8 and B cannot be 8). What is the largest possible value of the four-digit integer ABCD?

$$\begin{array}{r} AB \\ -BC \\ \hline CD \end{array}$$

2009 Rocket City Junior Math Mania
Probability Test – 5th Grade

1. When a card is drawn from a standard 52-card deck, what is the probability that it is a red seven?

2. In how many ways can a person travel from point A to point B on the streets shown if they must always travel down or right?



3. In how many ways can the letters in the word "SYZYGY" be arranged?

4. In a three-element data set of distinct integer test scores from 0 to 100 inclusive, the median is 41, the mean is 48, and the range is 43. What is the largest element in the data set?

5. What is the mode of the data set 4, 4, 7, 9, 9, 13, 15, 23, 32, 32, 32, 41, 41?

6. When trying to plan a family reunion for the 123 members of my extended family, 44 can come in June, and 45 can come in August. 22 can come in June and July, 19 can come in July and August, and 23 can come in June and August, while 9 can come in June, July, or August and 11 cannot come in any of those months. How many of them can come in July?

7. The probability that I eat breakfast in the morning is $\frac{5}{6}$ and the probability that I take a nap in the afternoon is $\frac{2}{9}$. If these events are independent, what is the probability that I do neither?

8. A trusted friend draws two marbles from a bag containing five blue and three white marbles, examines them, and tells you that they are not both blue. What is the probability that they are both white?

9. What is the mean of the data set 3, 7, 19, 31?

10. In the game of Domjot, a player pays \$4 to roll a fair six-sided die. If the player rolls a 3 or less, they receive \$3 back. If they roll a 4 or 5 they receive \$2 back. If they roll a 6, they receive \$8 back. What is the expected value of the player's gain in dollars (perhaps negative) in this game?