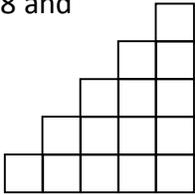


2013 Rocket City Junior Math Mania

Individual Test – 8th Grade

1. For a certain rectangle, the area is 108, and the length is 3 times the width. What is the perimeter of the rectangle?
2. An “arithmetic” sequence is one in which there is a “common difference” between each pair of terms. What is the tenth term of a sequence with first term -48 and common difference 9?
3. In the figure to the right made up of unit squares, how many squares of any size appear?
4. If 40% of a number is 32, what is 60% of that number?
5. What is the circumference, in meters, of a circle with a radius of 23 m? (Leave answer in terms of π .)
6. When I add my two favorite numbers, I get a sum of 123. When I subtract the smaller number from the larger number, I get a difference of 41. What is the smaller of the two numbers?
7. When I reverse the digits of a positive two-digit integer, the new number is 36 less than the original number. What is the largest possible value of the new number?
8. Five of your friends are going to come to your birthday party, and your parents say that you can invite two of them to spend the night afterwards. How many different “pairs” of friends can you invite?
9. Using the numerals 9, 8, and 6 exactly once each, and the operations of addition, subtraction, multiplication and division (and parentheses) as much as you like, write an expression that evaluates to 120.
10. If three Balloons can be exchanged for four Candles and five Candles can be exchanged for two Doorbells, what is the largest number of Doorbells you can get if you have 100 Balloons and can only make the exchanges described (you can never have fractions of items)?
11. Evaluate: $8^2 + 5 \times 4 - 2^3 + 9 \div 3$

12. How many prime numbers are greater than 113 and less than 127?
13. A pasture contains cowboys and horses. If there are 18 heads and 66 feet in the pasture, how many cowboys are there?
14. If $f(g) = 97 - 2g$, evaluate $f(14)$.
15. If a five-person team can paint four houses in three days, how many hours would it take a two-person team to paint six houses? Assume that teams work around the clock until the job is done.
16. Charles’s parents have an interesting method for giving him his allowance. If he does not spend his money, then his parents will double what he has at the end of the week. If Charles starts today with 1 penny, how much will he have after his parents double his money at the end of the 9th week from today? (Write your answers as dollars, like \$3.42.)
17. What value(s) of z satisfy $7z - 32 = 101$?
18. Simplify by distributing and combining like terms: $2d + 1d - 3$
19. What is the area, in square meters, of a right triangle with legs measuring 4 m and 13 m?
20. Evaluate: $|3 - 2 \times 4|$
21. Wanda and Vince are going to share a bag of 30 small candies. They decide that since Wanda is a little hungrier than Vince, they should split the candies in the ratio 3:2. How many candies will Vince get?
22. What is the surface area, in square meters, of a right rectangular prism with edges measuring 4 m, 7 m, and 8 m?
23. Evaluate: $71^2 - 69^2$
24. What is the greatest common factor of 117 and 156?
25. What is the distance between the points (-3,2) and (5,8)?
26. The height of the tallest person in class is five feet, seven inches, and the height of the shortest person in class is three feet, eleven inches. What is the difference, in inches, between these two heights?

27. The price of a book is \$24.00. If there will be 4% sales tax, how much will you have to pay to get the book, in dollars to two decimal places (cents)?
28. Bill and Ted each roll a fair six-sided die. What is the probability that Bill rolls a higher number than Ted?
29. What is the equation, in slope-intercept $y = mx + b$ form, of the line through the points 4,9 and 2,5 ?
30. What are the coordinates, in the form x, y , of the reflection of the point $9, -3$ across the line $x = 2$?
- TB1: What ordered pair, in the form v, w , satisfies the system of equations $v + w = 3$ and $2v + 3w = 10$?
- TB2: What is the sum of the positive integers less than 25?
- TB3: Express the base ten number 356_{10} as a base eight number.