

2010 Rocket City Junior Math Mania
Individual Test – 7th Grade

1. Evaluate **as a decimal**: 352.7×19 .
2. When my favorite number is divided by three and this result is then increased by seven, the final result is nineteen. What is my favorite number?
3. What is the perimeter, in meters, of a regular pentagon with sides measuring 9 m each?
4. When I asked the 38 people at my party what they wanted on their pizza, 22 said olives and 29 said mushrooms. If 4 people wanted neither of these, how many wanted both?
5. If 40% of a number is 18, what is 60% of the same number?
6. What is 20% of one less than three times the sum of twenty-nine and eighteen?
7. When the point $(-4, -9)$ is reflected across the line $x = 3$, what are the coordinates of the reflection in the form (x, y) ?
8. What is the area, in square meters, of a right triangle with legs measuring 8 m and 9 m?
9. What is the sum of the positive odd numbers less than 25?
10. Using the numerals 2, 3, 4, and 6 exactly once each and the operations $+$, $-$, \times , and \div (and parentheses) as much as you like, write an expression equal to 23.
11. Round the number 123.456 to the nearest tenth.
12. When a positive, two-digit number is tripled and this result is reduced by two, the result is the same number except that its digits have been reversed. What was the original number?
13. An angle is supplementary to 140° . What is the measure, in degrees, of the angle's complement?
14. What are the coordinates, in the form (x, y) , of the y-intercept of the parabola with equation:
 $y = 3x^2 - 7x + 14$.
15. What is the median of the data set $\{7, 3, 19, 4, 9, 11, 8, 15, 1\}$?
16. Evaluate: $9^2 - 8 \times (7 + 6) \div 4$
17. What value(s) of b satisfy $4b - 5 = 23$?
18. A cow is tied to an external corner of a rectangular barn measuring 20 m by 35 m. If the cow's rope is 30 m long, what is the area, in square meters, which the cow can graze? Note: the barn door is closed; the cow cannot get into the barn.
19. What is the sum of the first six terms of the arithmetic sequence with first term 7 and common difference 8?

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20. What is the sum of the number of vertices on a nonagon, the number of faces on a cube, and the number of seconds in an hour?
21. What is the equation, in slope-intercept ($y = mx + b$) form, of the line through the points $(-6, 2)$ and $(-4, -4)$?
22. Convert the base 10 number 87_{10} to base 4.
23. In how many ways can five people sit relative to one another at a round table?
24. In the Psionic Square shown, the numerals 1-8 can be placed one per cell so that every row, column, and diagonal has the same sum. What numeral must be in the center cell?
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25. Express the solution to the system of equations $2c + d = 7$ and $c - d = 2$ as an ordered pair (c, d) .
26. A right triangle has legs measuring 15 m and 20 m. What is the length, in meters, of the altitude to its hypotenuse?
27. What value(s) of b satisfy the equation: $b^2 - b - 6 = 0$.
28. Solve for x : $\frac{x+1}{12} + \frac{2x-3}{33} = \frac{x}{7}$.
29. How many subsets of the set $\{2, 4, 8, 16\}$ contain the element 8?
30. If John has 7 brownies, 3 cookies, and 12 candy bars, and he chooses one dessert at random, what is the probability he doesn't choose a brownie?