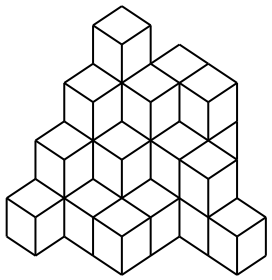
2009 Rocket City Junior Math Mania
Individual Test – 5th Grade

1. Evaluate: 3^4

2. What is the 18th term of an arithmetic sequence with first term 42 and common difference 7?

3. An 8-by-10 (inches) picture has a rectangular frame with a width of one inch all the way around the picture. What is the area of the frame, in square centimeters?

4. How many unit cubes are needed to build the stack shown?



5. Quincy the Hamster is currently one-third of his mother's age, and in nine years will be two-thirds of his mother's age. What is Quincy's current age?

6. Evaluate: $\begin{array}{r} 23 \\ \times 7 \\ \hline \end{array}$

7. If three Wombats can be exchanged for ten Vultures or four Unicorns, how many Vultures could be exchanged for 218 Unicorns?

8. What is the volume of a sphere with a radius of 6 cm?

9. What is the sum of the positive integer factors of 24?

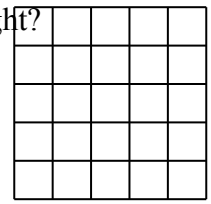
10. Cindy, Doug, and Emeril each have a favorite article of clothing. They are a hat, a shirt, and shoes that are red, white, and blue (not necessarily in those orders). Cindy's article is not blue, Doug's article is not a shirt, and the red shoes are not Emeril's. If Cindy's article is not shoes and the hat is not white, what article and color does Doug have?

11. Evaluate: $9\overline{)2016}$

12. What is the distance from the point $(1,-6)$ to the point $(-3,-3)$?

13. What is the surface area of a right circular cylinder with a base radius of 3 cm and a height of 4 cm?

14. How many squares of any size appear in the grid of unit squares to the right?



15. In a school with 87 eighth-graders, 36 are taking Geometry and 58 are taking Algebra. If 14 are taking both, how many are taking neither?

16. If Xu runs thirteen miles in two hours, and then runs at 5 mph for an hour, what was his average speed over the three hours?

17. What is the next term of the sequence beginning 15, 20, 19, 22, 23, 24, 27, 26, 31?

18. Express the base ten number 31_{10} as a base four number.

19. How many minutes are in two weeks?

20. How many isosceles triangles are there with integer side lengths and perimeters of 24 when all dimensions are measured in centimeters?

21. List A, B, and C in ascending order if $A = 19 \times 15$, $B = 143 + 137$, and $C = 345 - 126$.

22. What is the digit in the hundredths place in the number 1234.5678?

23. What are the coordinates, in the form (x, y), of the x-intercept of the line $5x - 2y = 30$?

24. How many positive three-digit integers are palindromes (numbers that read the same forward or backward)?

25. What is the sum of the interior angles in an octagon?

26. What is the sum of the infinite geometric sequence with first term 27 and common ratio $\frac{2}{3}$?

27. If t is inversely proportional to u and $u = 6$ when $t = 48$, what is the value of t when $u = 12$?

28. If Zack could paint the fence in nine hours on his own and Yasmine could paint it in eleven hours by herself, how many **minutes** would it take the two of them working together?

29. The probability that I eat pizza today is $\frac{3}{4}$, and the probability that I eat both pizza and pasta today is $\frac{1}{3}$. If these events are independent, what is the probability that I don't eat pasta today?

30. What is the area, in square centimeters, of a hexagon with sides measuring 8 cm?