Name_____ Math Level_____

Rocket City Math League

Apollo Test

2004-2005
Round 1

Answers must be written inside the adjacent answer boxes. All answers must be written in exact, reduced, simplified, and rationalized form. All decimals and mixed numbers must be written as improper fractions, and all times must specify AM or PM (unless requested otherwise in the problem). **No calculators, books, or other aides may be used.**

1. If $f(x)=5x^4 - 2x^3 + 7x^2 - 13x + 5$ then find f(1). *(1 point)*	
2. The measure of the supplement of an angle is $(7x - 5)°$, and the measure of the complement is $(2x+5)°$. Find the measure of the angle. *(1 point)*	
3. Planet Octon is inhabited by Octonites who work only in base 8. NASA needs 750 scientists from Octon to work on a project. How many Octonites (in base 8) should NASA request? *(1 point)*	
4. The number of planets varies inversely as the number of stars squared in the galaxy. When there were 4 planets, there were 10 stars. How many planets were there when there were only 2 stars? *(1 point)*	
5. In the space shuttle *Saturn*, Astronaut Bob has 3^x computer files, Astronaut Jane has 3^{x+3} files, and Astronaut Tom has 3^{x+2} files. They have 999 files between the three of them. What is the value of x? *(2 points)*	
6. NASA needed 10 people to work on the Space Shuttle, *Saturn*: 2 astronauts, 5 technicians, and 3 programmers. Tom and his 9 friends, each capable of doing any of the three jobs, sign up for this work. In how many ways can these jobs be assigned to Tom and his friends? *(2 points)*	
7. In the Harry Potter series, "I am Lord Voldemort" is derived from rearranging the letters in the (Muggle) name Tom Marvolo Riddle. Let *a* equal the number of distinct arrangements of these letters. How many zeroes are at the end of *a*? In this problem, disregard spaces and capitalization. *(2 points)*	
8. On planet Gol, ages are calculated in terms of logs. If, on planet Gol, Zihz is $\log_7 (m + 1)$ years old, and Zaminy is $\log_7 (m - 5)$ years old, and the sum of Zihz's and Zaminy's ages is 1, what is m? *(2 points)*	
9. A fence with a total length of 160 encloses a rectangular field beside a river. If the fence only has three sides (the river being the fourth side), what is the maximum area that can be enclosed by this fence? *(3 points)*	
10. The triangle formed by the points (0,0,0), (3,0,0), and (7,6,0) is rotated 360° around the x-axis. What is the volume of the figure that is created by the rotation of this triangle? *(3 points)*	
11. Given $S = \dfrac{1+2+3+4+5+...+2002+2003+2004}{1+4+9+16+...+2002^2+2003^2+2004^2}$, if S is written in the form $\dfrac{a}{b}$ in lowest terms, find the value of $a+b$. *(3 points)*	
12. Two kids, Xyplon and Krunzon, from planet Tykerob, are playing a game of probability. A bag contains 53 blue, 7 purple, and 38 red marbles. Each boy pulls out a marble and if it is not purple, puts the marble back into the bag. The boy who pulls out a purple marble first wins. If Xyplon goes first, what is the probability Xyplon wins on his second turn? *(4 points)*	

The material on this page is the property of the Rocket City Math League. Reproduction other than for non-profit educational purposes is strictly prohibited without the expressed written consent of the RCML.