



## Rocket City Math League Mercury Test

**2005-2006  
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. **No calculators, books, or other aides may be used.**

1. In 1985, the population of the planet Zeebu was 105. One year later, the population had decreased to 90, and in 1987, the population was 75. If the drop in the population continues at the same rate, then what will be the sum of the digits in the year in which the population of planet Zeebu reaches 0? (1 point)	
2. If $R=7^3$ , $C= \sqrt{121}$ , $M=$ the product of the prime numbers between 6 and 16, and $L=$ the number of positive integral divisors of 48, then find $R - C + M - L$ . (1 point)	
3. What are the coordinates of the midpoint of the line segment with endpoints $(-7,12)$ and $(13,6)$ ? (1 point)	
4. During a holiday sale, the original price of a stylish MAΘ blazer is marked down 20% and then an additional 10%. After Johnny uses a 5 dollar discount coupon, the final price of the blazer is \$31. What was the original price of the blazer? (1 point)	
5. It's MAΘ team sack race day! Team A hops 4 feet per hop at a rate of 60 hops per minute, Team B hops 9 feet per hop at a rate of 30 hops per minute, and Team C hops 14 feet per hop at a rate of 20 hops per minute. If the length of the race is 1400 feet, how many minutes will it take the winning team to cross the finish line? (2 points)	
6. The sum of the digits in a two digit number is 10. When the digits are reversed, the new number is 18 less than the original number. What is the original number? (2 points)	
7. Astronaut Joe dropped a ball on Pluto and noticed that after it struck the ground the ball bounced back $\frac{4}{5}$ of the distance it was dropped before it fell to the ground again. If Joe decides to drop a ball from 50 feet above Pluto's surface, how far will the ball have traveled once it strikes the ground the third time? (2 points)	
8. Find the least common multiple of 121 and 3619. (2 points)	
9. In solar system O, the planets orbit in perfect circles around star X. If planet A is 4 miles away from star X and planet B is 5 miles away from star X, then what is the area within the orbit of planet B that is outside the orbit of planet A? (3 points)	
10. It takes Bill and Pat 4 and 5 hours, respectively, to mow Bill's yard. One day, Bill started mowing his yard at noon and mowed for one hour before he was joined by Pat. The two then finished mowing the yard together. At what time that afternoon did Pat and Bill finish mowing? (3 points)	
11. Find the distance between the points of intersection of the graphs of $y - x = 4$ and $x^2 = y - 2$ . (3 points)	
12. Find the area of the region bounded by the graphs of $x - 4y = -8$ , $x + y = -8$ , and $3x - 2y = 6$ . (4 points)	

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