



Rocket City Math League

Mercury Test

2004-2005
Round 2

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.**

<p>1. On Yavin 4, the natives frequently use a fair 11-sided die numbered 1 through 11 for board games. If Luke's opponent, Han Solo, just rolled an 11, what is the probability that Luke rolls an 11 as well? <i>(1 point)</i></p>																	
<p>2. Martian Happy Meals are the latest craze on Saturn. Every Martian Happy Meal contains an Earthling action figure, a toy laser zapper, or a Martian mood ring. What is the least number of Martian Happy Meals that Ben must buy to ensure that he has at least two of the same kind of toy? <i>(1 point)</i></p>																	
<p>3. Princess Leia has 100 credits. She then loses some of them while fighting a Sith. After her fight, she uses half of her credits at a hospital and then $\frac{2}{3}$ of the remaining money at a clothing store. If she is then left with 10 credits, how many credits did Leia lose during her fight? <i>(1 point)</i></p>																	
<p>4. A cosmonaut floats away from the International Space Station at a rate of 150 meters per minute. How many kilometers away is the cosmonaut from the Space Station after $5\frac{2}{3}$ hours? <i>(1 point)</i></p>																	
<p>5. The three differently shaped alien heads found in the system of equations below each represent a unique positive integer. Find the value represented by the triangle alien head. <i>(2 points)</i></p> $\text{☺} \times \text{☹} + \text{▲} = 7$ $\text{☹} - \text{☺} - \text{☹} = 1$ $\text{☺} + \text{☹} \times \text{☹} = 10$																	
<p>6. A rocket uses 20% of the available fuel in its fuel tank every minute. What percentage of the original amount of fuel is left in the rocket's fuel tank after 3 minutes? <i>(2 points)</i></p>																	
<p>7. Astronaut Tom's ice cream pack is missing. Four of his crewmates made the following statements about the ice cream: David said, "Kris ate it." Bob said, "I didn't eat it." Kris said, "Chad ate it." Chad said, "Kris lied when he said I ate it." Given that exactly one statement is true, and only one crewmate ate the ice cream, who ate the ice cream? <i>(2 points)</i></p>																	
<p>8. Two intergalactic standard days are equivalent to three days on the planet Hoth. Darth Vader's body suit malfunctions every 100 intergalactic standard days. What is the least number of times Darth Vader's suit can malfunction on Hoth over a period of 798 days? <i>(2 points)</i></p>																	
<p>9. A Martian couple must find their Prodate (the product of their ages) before they can marry. The ages of a certain Martian couple have a greatest common factor of 12 and a least common multiple of 1008. Find their Prodate. <i>(3 points)</i></p>																	
<p>10. Find $a + b + c$ if all four grids below follow the same pattern. <i>(3 points)</i></p> <table style="margin-left: auto; margin-right: auto; text-align: center;"> <tbody> <tr> <td style="border: 1px solid black; padding: 2px;">6</td><td style="border: 1px solid black; padding: 2px;">36</td> <td style="border: 1px solid black; padding: 2px;">8</td><td style="border: 1px solid black; padding: 2px;">64</td> <td style="border: 1px solid black; padding: 2px;">5</td><td style="border: 1px solid black; padding: 2px;">25</td> <td style="border: 1px solid black; padding: 2px;">2</td><td style="border: 1px solid black; padding: 2px;">A</td> </tr> <tr> <td style="border: 1px solid black; padding: 2px;">16</td><td style="border: 1px solid black; padding: 2px;">12</td> <td style="border: 1px solid black; padding: 2px;">36</td><td style="border: 1px solid black; padding: 2px;">16</td> <td style="border: 1px solid black; padding: 2px;">9</td><td style="border: 1px solid black; padding: 2px;">10</td> <td style="border: 1px solid black; padding: 2px;">B</td><td style="border: 1px solid black; padding: 2px;">C</td> </tr> </tbody> </table>	6	36	8	64	5	25	2	A	16	12	36	16	9	10	B	C	
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16	12	36	16	9	10	B	C										
<p>11. The Antarctic Center for Extraterrestrial Research was built 256 days ago. On what day of the week will the Center turn exactly 1 year old if the next leap year is in 2 years and tomorrow is Sunday? <i>(3 points)</i></p>																	
<p>12. Use each arithmetic symbol (+, -, \times, \div) only once to fill in the blanks in the equation below. Find the maximum possible value for S. <i>(4 points)</i></p> $2 \square 3 \square 4 \square 8 \square 4 = S$																	