2010 Shoreline Math Olympiad
Team Test Answer Sheet

Team member’s name:

5th Grade  Test # 1

ANSWERS: * units required, * if you write units, they have to be correct whether they were required or not. Be careful!

1. 37  
2. 35 15  5. -5  
3. 7.5 sq units  6. 4:30 PM  
4. 28 rows  7. 21.3 feet

2010 Shoreline Math Olympiad
Team Test Answer Sheet

Team member’s name:

5th Grade  Test # 2

ANSWERS:

1. 120  
2. 80%  5. 180 degrees Fahrenheit
3. $2  6. 24
4. 1000, 1001, 1010  7. 20 pounds
1. What is the largest prime factor of 999?  
\[ 3^3 \times 37 \]

2. The binary number system uses just ones and zeros. How many binary numbers (numbers consisting of just 1s and 0s) between 1 and 1,000,000 have exactly three zeros?

3. What is the area of the triangle shown (in square units)?

4. On a particular airplane, the first class row has four seats and an economy class row has six seats. If the airplane has 33 rows and 188 seats, how many rows are there in economy class?

All first class \(33 \times 4 = 132\) seats

Need for place \(\rightarrow 56\) seats

2 seats free

2 more seats per economy row

\[ 56 \div 2 \rightarrow 28 \text{ economy rows} \]
5. If I add up all the first ten digits in the sequence 1, -2, +3, -4, +5, ..., what number do I get? 

6. Jimmy gets on a plane at 2:46 PM in Washington DC. Due to the time change, it is three hours earlier in Seattle. If his flight lasts four hours and forty four minutes, what time is it when he arrives in Seattle?

\[2:46 \text{ PM} + 4:44 \text{ h} = 6:30 \text{ PM} \text{ DC}\]
\[4:30 \text{ PM} \text{ Seattle}\]

7. What is the length of the alien spacecraft’s timing belt (indicated by the thick line)? Report the answer to the nearest tenth.

\[6 + 6 + 3 + 7 \times 1 \times 2 = 15 + 2\pi \approx 21.28 \text{ feet}
\]

Curved parts add up to one circle.
The colored quadrilaterals are rectangles.
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1. A particular computer password form consists of the numbers 0 to 9 arranged in any order, each used once. If “2” is always the second digit, “4” the fourth, “6” the sixth, “8” the eighth, and “0” the tenth, then how many different passwords are possible?

\[ 5! = 120 \]

2. What percentage of the figure is shaded?

\[ \frac{25 - 5}{25} \times 100 = 80\% \]

3. If a fossilized triceratops tooth costs one dollar more than half its price, how much does it cost?

\[ \$2 \]

4. What are the next three entries in the following sequence: 1, 10, 11, 100, 101, 110, 111, …?

Number written in base 2

\[ \overline{1000, 1001, 1010} \]
5. The Celsius temperature scale is related to the Fahrenheit temperature scale by the following equation: degrees Fahrenheit = (9/5) (degrees Celsius) + 32. 100 degrees Celsius is the temperature at which water boils and 0 degrees Celsius is the temperature at which it freezes, so the range from freezing to boiling is 100 degrees Celsius. What is the range from freezing to boiling on the Fahrenheit scale?

\[ \frac{9}{5} \times (100 - 0) = 180 \text{ degrees F} \]

6. If 5/7 of a class of 56 is girls and the rest are boys, how many more girls are there than boys?

\[ \left( \frac{5}{7} - \frac{2}{7} \right) = \frac{3}{7} \quad \frac{3}{7} \times 56 = 24 \]

7. At the beginning of day 1, a vat contains 10 pounds of microbes (single cell creatures). At the end of day 1 the vat has one additional microbe for every nine microbes that it had at the beginning of the day. At the end of day 2 the vat has one additional microbe for every eight microbes that it had at the beginning of the day. At the end of day 3 the vat has one additional microbe for every seven microbes that it had at the beginning of the day. At the end of day 4 the vat has one additional microbe for every six microbes that it had at the beginning of the day. At the end of day 5 the vat has one additional microbe for every five microbes that it had at the beginning of the day. How many pounds of microbes does the vat have at the end of day 5?

\[ \frac{10 \times \frac{10}{9} \times \frac{9}{8} \times \frac{8}{7} \times \frac{7}{6} \times \frac{6}{5}}{5} = 20 \text{ pounds} \]