Name: ____________________________  

Instructor: (circle one)  
Jinxia Xie  
AnnMarie O’Neil  
Lenny Mwathi

Directions: Answer all of the following questions. Some questions may have multiple parts. Be sure to show all of your work. Unsupported claims will receive little or no credit. You may use a calculator (not the one on your cell phone). There should be no collaboration with anyone else. Be sure to explain your answers as clearly as you can. If you need more space to work on a problem, clearly indicate where the solution to the problem can be found.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Possible Points</th>
<th>Your Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group Test</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>6</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
1. (5 pts) Jenna says that she can prove that the two triangles below are congruent. Erika disagrees. She says that there is enough information to prove the two triangles similar, but you cannot prove them congruent because the length of the third side of each triangle is missing. Who is correct? Justify your answer.

![Triangles](image)

Note: Drawings are not necessarily to scale.

2. (2 pts each) Classify each of the following statements as either TRUE or FALSE. If the statement is false, provide a counterexample or correct the statement. If the statement is true, justify your answer using what you know about the definitions of geometric figures.

   a. All equilateral triangles are isosceles triangles.

   b. If a parallelogram has one right angle, then it is a rectangle.

   c. Corresponding angles are supplementary.

   d. All rectangles are squares.
3. (6 pts) Assume the blank square below represents 1 unit. Answer the following questions for each of the squares.

a. What fraction of the square is more darkly shaded?
   Square 1:  
   Square 2:  

b. Write the multiplication sentence that indicates how the darkly shaded fraction is obtained.
   Square 1:  
   Square 2:  

4. (6 pts) At the end of 2004, The Lord of the Rings: The Return of the King had total lifetime earnings of $1.2 billion. 66% of the earnings came from outside the United States. $73 million of the total earnings were collected on opening weekend.
   a. Determine the amount of money that came from outside the United States.
   b. What percent of the total gross was collected on opening weekend?

5. (6 pts) If the circles in A represent 3/5 of a unit, what do the circles in B represent? Justify your reasoning.
   A  O O O  
   O O O  
   B  O O O O O O  
   O O O O O O
6. (10 pts) A landscape architect is designing a symmetrical flowerbed to wrap around a circular patio, as shown. The radius of the patio is 6 ft, and the width of the flowerbed is equal to the diameter of the patio.

![Diagram of a circular patio with a flowerbed around it]

a. What is the area of the flowerbed?

b. What is the perimeter of the flowerbed?
7. Lines $r$ and $s$ in the figure below are parallel. $\overline{AE}$ and $\overline{BD}$ intersect at point C.

![Diagram of parallel lines with points A, B, C, D, and E]

a.) (4 pts) Prove that $\triangle ABC$ is similar to $\triangle EDC$.

b.) (3 pts) Given that $\overline{DE} = 6.5$ cm, $\overline{CD} = 5.2$ cm, and $\overline{AB} = 3$ cm, find the length of $\overline{BC}$. 
8. (4 pts each) Illustrate the following using a diagram. Then use the diagram to find a solution. Be sure to label your illustrations (including what represents “1” in the diagram).

   a. \( \frac{3}{4} \times \frac{1}{3} \)
   
   b. \( \frac{3}{5} \div \frac{2}{3} \)

9. (4 pts each) In the space provided, write whether each of the following statements is SOMETIMES, ALWAYS, or NEVER TRUE. Then justify your answer.

   a. If \( x > 0, y > 0, \) and \( x > y, \) then \( \frac{1}{x} < \frac{1}{y} \)

   b. If \( x \neq 0, \) then \( \frac{1}{x} < x. \)
10. (6 pts) Out of every 100 students at a two-year college, 48 are female.
   a. Express the number of females to males as a ratio.

   b. Will the ratio remain the same, become greater, or become smaller if 10 more females and 10 more males join the college? Explain.

11. (5 pts) Illustrate $0.8 + 0.3$ by drawing a model using base-10 blocks. Explain your model and solution. Give your answer as a fraction. Be sure to state what you take to be one unit.
12. Use the following numbers to answer the questions below:

\[
\sqrt{36}, \frac{3}{4}, 4.55555..., \pi, 0, \frac{13}{16}, \sqrt{8}, -1.914, 0.72
\]

a. (2 points) Which numbers above are irrational numbers? How do you know?

b. (5 points) For the rational numbers above, rewrite them as either fractions or integers, if they are not already given in that form.

c. (3 points) Find a number that is between \(\frac{3}{4}\) and \(\frac{13}{16}\). Explain how you found it.