1. You work for the highway department for your county board. You are in charge of determining if and where new roads will be built. Currently there are three towns in your county. NOTE: All distances are measured in miles.

   a. On the coordinate graph below, place Milwaukee at (3, 5), Menomonee Falls at (3, 15), and Cudahy at (15, 1). Label each point. Connect all three towns with straight lines.

   b. Use the distance formula to determine which town is closest to Milwaukee. Show all work.

   c. A new road is being built that will connect the midpoint between Menomonee Falls and Cudahy with the midpoint between Milwaukee and Menomonee Falls. Find the midpoints, list them below and label them on the graph. Then connect the midpoints creating the new road. Show all work.

   d. Using a protractor, find one of the angle measures where the new road meets the road between Milwaukee and Menomonee Falls. Measure to the nearest degree.
2. Refer to the diagram below to answer the following:
   a. Name an obtuse angle: _____________________
   b. Name an acute angle: _____________________
   c. Name two supplementary angles: _____________ and _____________
   d. If \( \angle 3 = 63^\circ \), find the measures of: \( \angle 4: \) _____________ and \( \angle 5: \) _____________

   ![Diagram]

3. Points on a graph are P (4, -4), Q (1, -1) and R (-2, 2). Determine if Q is the midpoint of the line segment PR. Show all of your work.

   ![Graph]

Multiple Choice: Choose the correct answer and put the letter on the blank.

1. _______ Find the next number in the sequence: \{2, 6, 18, 54, \ldots\}.
   A. 72       B. 160       C. 162       D. 216

2. _______ Find the approximate area of a circle with a radius of 12 inches. Use \( \pi = 3.14 \).
   A. 452 in\(^2\)       B. 38 in\(^2\)       C. 75 in\(^2\)       D. 75 in\(^2\)

3. _______ The area of a rectangle is 36 ft\(^2\). Its length is 9 feet. Find the perimeter.
   A. 4 feet       B. 294 feet       C. 26 feet       D. 13 feet
4. _______ ∠A and ∠C are complementary. The measure of ∠C is three times the measure of ∠A. What is the m∠A?
   A. 90°     B. 22.5°     C. 30°     D. 45°

5. _______ In the diagram at the right, ray BD bisects ∠ABC. Find the value of x.
   A. 12     B. -12     C. 20     D. 9

Short Answer:

6. Using either angles or segments, describe the difference between the two symbols = and ≅.
1. Using the information given, write a two-column proof. Use the conclusions listed to fill in the blanks.

A baseball diamond is shown below:

![Baseball diamond diagram]

**GIVEN:** The pitchers mound is at $\angle 3$.
- $m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$
- $m\angle 1 + m\angle 2 = 93^\circ$
- $m\angle 3 + m\angle 4 = 180^\circ$

**PROVE:** $m\angle 4 = 93^\circ$

<table>
<thead>
<tr>
<th>STATEMENT</th>
<th>CONCLUSION</th>
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<tbody>
<tr>
<td>1. $m\angle 1 + m\angle 2 + m\angle 3 = 180^\circ$</td>
<td>1. ___________________________</td>
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<tr>
<td>2. $m\angle 1 + m\angle 2 = 93^\circ$</td>
<td>2. ___________________________</td>
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<tr>
<td>3. $93^\circ + m\angle 3 = 180^\circ$</td>
<td>3. ___________________________</td>
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<tr>
<td>4. $m\angle 3 = 87^\circ$</td>
<td>4. ___________________________</td>
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<tr>
<td>5. $m\angle 3 + m\angle 4 = 180^\circ$</td>
<td>5. ___________________________</td>
</tr>
<tr>
<td>6. $87^\circ + m\angle 4 = 180^\circ$</td>
<td>6. ___________________________</td>
</tr>
<tr>
<td>7. $m\angle 4 = 93^\circ$</td>
<td>7. ___________________________</td>
</tr>
</tbody>
</table>

**Conclusion Choices:**
- Given
- Substitution Property of Equality
- Subtraction Property of Equality
2. For each diagram below, find \( \angle 1 \), \( \angle 2 \) and \( \angle 3 \).

a. 
\[ \begin{align*}
\angle 1 &= \_\_\_\_\_\_ \\
\angle 2 &= \_\_\_\_\_\_ \\
\angle 3 &= \_\_\_\_\_\_ 
\end{align*} \]

b. 
\[ \begin{align*}
\angle 1 &= \_\_\_\_\_\_ \\
\angle 2 &= \_\_\_\_\_\_ \\
\angle 3 &= \_\_\_\_\_\_ 
\end{align*} \]

c. 
\[ \begin{align*}
\angle 1 &= \_\_\_\_\_\_ \\
\angle 2 &= \_\_\_\_\_\_ \\
\angle 3 &= \_\_\_\_\_\_ 
\end{align*} \]

3. Find the value of \( x \) and \( y \).

\[ \begin{align*}
x &= \_\_\_\_\_\_ \\
y &= \_\_\_\_\_\_ 
\end{align*} \]

4. Write the inverse, converse and contrapositive of the following conditional statement.

**If a polygon has four sides, then it is a quadrilateral.**

**Inverse:**

**Converse:**

**Contrapositive:**

5. Use the given information to find the value of \( x \).

a. Given: \( \overline{GM} = 28 \)
   
   \[ \begin{align*}
x + 3 &= 2x - 8 \\
G & \quad A \quad M
\end{align*} \]

b. Given: \( \overline{AB} \cong \overline{BC} \), \( \overline{BC} \cong \overline{CD} \)
   
   \[ \begin{align*}
2x + 1 &= 4x - 5 \\
A & \quad B \quad C \quad D
\end{align*} \]
Matching: Match the statement with the property it illustrates.

1. \( m\angle DEF = m\angle DEF \)  
   A. Reflexive Property of Equality
2. If \( PO \cong ST \), then \( ST \cong PQ \)  
   B. Symmetric Property of Equality
3. \( XY \cong XY \)  
   C. Transitive Property of Equality
4. If \( \angle J \cong \angle K \) and \( \angle K \cong \angle L \), then \( \angle J \cong \angle L \)  
   D. Reflexive Property of Congruence
5. If \( PQ = QR \) and \( QR = RS \), then \( PQ = RS \)  
   E. Symmetric Property of Congruence
6. If \( m\angle X = m\angle Y \), then \( m\angle Y = m\angle X \)  
   F. Transitive Property of Congruence

Short Answer

7. Can an Inverse and a Converse of the same statement be the same? Explain.
   __________________________________________________________
   __________________________________________________________
   __________________________________________________________
Classroom Assessments Based on Standards
Geometry – Chapter 3 – GML203

Student Name: ________________________________  ID Number: __________________
Teacher Name: ________________________________  Date _________________________

1. Use the diagram to match the angle pairs to the correct type.

<table>
<thead>
<tr>
<th>1</th>
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<th>3</th>
<th>4</th>
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<tbody>
<tr>
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<td>13</td>
<td>14</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

a. _____ ∠1 and ∠3  1. Alternate Interior Angles
b. _____ ∠2 and ∠13  2. Alternate Exterior Angles
c. _____ ∠8 and ∠11  3. Consecutive Interior Angles
d. _____ ∠6 and ∠7   4. Corresponding Angles
e. _____ ∠12 and ∠15  5. Linear Pair
f. _____ ∠9 and ∠10  6. Vertical Angles

2. On the diagram at the right, l || m and a || b.

a. Which angles are congruent to 42°?  

b. Which angles are supplementary to 42°?

3. Use the given diagram and the information to determine which lines, if any, MUST be parallel.

a. ∠1 ≅ ∠7
b. ∠2 and ∠3 are right angles.
c. ∠2 ≅ ∠5
d. ∠4 is supplementary to ∠6.
4. Points A(-2,0), B(2,2) and C(4,-2) form a triangle. Determine if this is a right triangle. How do you know? Show all of your work.

Multiple Choice: Choose the correct answer and put the letter on the blank.

1._______ Which of the following lines is parallel to \( y = \left(\frac{-5}{7}\right) x + 2\)?

   A. \( y + \left(\frac{5}{7}\right)x = -5 \)  
   B. \( y = \left(\frac{7}{5}\right)x - 3 \)  
   C. \( y = \left(\frac{5}{7}\right)x = 9 \)  
   D. \( y = \left(\frac{-7}{5}\right)x - 3 \)

2._______ A line \( m \) has an equation \( y = \left(\frac{-1}{4}\right) x - 6 \). If line \( k \) is perpendicular to line \( m \) and passes through the point(5,-2), what is an equation of line \( k \)?

   A. \( y = 4x + 22 \)  
   B. \( y = 4x - 22 \)  
   C. \( y = \left(-\frac{1}{4}\right)x - 22 \)  
   D. \( y = \left(-\frac{1}{4}\right)x + 22 \)

3._______ Use the graph at right to determine which line are parallel?

   A. \( m \parallel n \)  
   B. \( m \parallel p \)  
   C. none  
   D. \( n \parallel p \)
4._______ Which angle is supplementary to $\angle 6$?
   A. $\angle 1$         B. $\angle 10$     C. $\angle 14$     D. none of these

5._______ If $m\angle 11 = 27^\circ$, then $m\angle 8 =$
   A. 63°             B. 72°        C. 153°        D. 27°

6._______ $\angle 9$ and $\angle 14$ are:
   A. Corresponding angles   B. Supplementary angles
   C. Vertical angles        D. Alternate Interior angles

7._______ If $\angle 6 \cong \angle 9$ then which lines are parallel?
   A. $l \parallel m$     B. $l \parallel p$    C. $m \parallel q$    D. $p \parallel q$

Short Answer:

8. Explain the difference between parallel, perpendicular and skew lines.
Classroom Assessments Based on Standards
Geometry – Chapter 4 – GML204

Student Name: ___________________________________________  ID Number: __________________
Teacher Name: ___________________________________________  Date___________________________

1. Find the measures of the numbered angles.

\[ \begin{align*}
\text{m} \angle 1 &= \_\_\_\_ \quad \text{m} \angle 2 &= \_\_\_\_ \quad \text{m} \angle 3 &= \_\_\_\_ \quad \text{m} \angle 4 &= \_\_\_\_ \quad \text{m} \angle 5 &= \_\_\_\_ \\
\text{m} \angle 6 &= \_\_\_\_ \quad \text{m} \angle 7 &= \_\_\_\_ \quad \text{m} \angle 8 &= \_\_\_\_ \quad \text{m} \angle 9 &= \_\_\_\_ \\
\end{align*} \]

2. Find the measures of the numbered angles. Then classify each triangle by its angles and its sides.

\[ \begin{align*}
\text{Classify by Sides} & \quad \text{Classify by Angles} \\
\Delta \text{ABC}: & \quad \_\_\_\_\_\_\_\_\_\_ \quad \_\_\_\_\_\_\_\_\_ \\
\Delta \_\_\_\_ & \quad \_\_\_\_\_\_\_\_\_ \quad \_\_\_\_\_\_\_\_\_ \\
\Delta \_\_\_\_ & \quad \_\_\_\_\_\_\_\_\_ \quad \_\_\_\_\_\_\_\_\_ \\
\Delta \_\_\_\_ & \quad \_\_\_\_\_\_\_\_\_ \quad \_\_\_\_\_\_\_\_\_ \\
\Delta \_\_\_\_ & \quad \_\_\_\_\_\_\_\_\_ \quad \_\_\_\_\_\_\_\_\_ \\
\end{align*} \]
3. Identify the triangles in the given figure:
   a. Equilateral: ______________________
   b. Isosceles: ______________________
   c. Scalene: ______________________
   d. Acute: ______________________
   e. Right: ______________________
   f. Obtuse: ______________________

Multiple Choice: Choose the correct answer and put the letter on the blank.

1._____ A square with a side length of 5 has one vertex at (2,0). Which of the following points cannot be a vertex of the square?
   A. (7,0) B. (0,7) C. (-3,0) D. (-3,-5)

2._____ Which postulate or theorem can be used to prove ΔABD ≅ ΔCDB?
   A. SSS B. SAS C. AAS D. ASA

3._____ What is the value of x?
   A. 5 B. 35 C. 15 D. 10

4._____ What is the measure of ∠XYZ?
   A. 142° B. 128° C. 118° D. none of these

Short Answer:

5. Decide whether enough information is given to prove that the triangles are congruent. Explain your answer.
1. **Prove:** The perpendicular bisectors of a triangle intersect at a point that is equidistant from the vertices of the triangles.

   a. Use the diagram above. Label all vertices of the triangle as A, B and C. Label the midpoints on the sides as D, E, and F. Label the inside point P.

   b. The inside point is called the _________________ of a triangle.

   c. Measure all segments inside the triangle in centimeters. You should have six (6) measurements.

<table>
<thead>
<tr>
<th>AP</th>
<th>BP</th>
<th>CP</th>
<th>DP</th>
<th>EP</th>
<th>FP</th>
</tr>
</thead>
</table>

   d. Looking at these measurements from c, which ones can you use to prove that the above statement is TRUE.

   ____________________________________________
2. **Landscape Design:** You are designing a circular pool for a triangular shaped park that is surrounded by three sidewalks. You want the center of the pool to be equidistant from the three sidewalks.

   a. Explain how you would find the center of the pool.

   _______________________________________________________________________
   _______________________________________________________________________
   _______________________________________________________________________

   b. Draw your picture below. Then use a protractor to draw the angle bisectors from each vertex of the triangle.

   c. What is the name of the point of concurrency? _____________________________.

Developed by the Milwaukee Mathematics Partnership (MMP) with support by the National Science Foundation under Grant No. 0314898.
3. **Graphing:** Using the graph shown below, graph the following points and connect them.

   M: (-1, -2)  N: (11, 2)  P: (5, 6)

![Graph](image)

a. Find the midpoint of MN and MP, label them Q and R, respectively. Show your work.

   The coordinates of Q are: ________
   The coordinates of R are: ________

b. Draw the two medians. Label the intersection of the two medians, T.

c. Find the length of the median NR: ____________

d. Juan says that PT is 2/3 the distance of PQ. Markesha disagrees. She says that PT and TQ are equal. Determine who is correct and show why.
4. **Mapping:** Wal-Mart wants to build a store that is central to the triangle below. Which point of concurrency should they use to find the center of the triangle?

Multiple Choice: Choose the correct answer and put the letter on the blank.

1. _____ In the triangle at the right, which angle is the largest?
   - A. \( \angle P \)
   - B. \( \angle Q \)
   - C. \( \angle S \)

2. _____ If \( P \) is the centroid in triangle \( ABC \) and \( PA = 12 \), what is the length of \( EP \)?
   - A. 8
   - B. 18
   - C. 12
   - D. 6

3. _____ If \( AD \) is the perpendicular bisector of \( CB \) and also bisects \( \angle CAB \), what is the value of \( x \)?
   - A. 31
   - B. 16
   - C. 6
   - D. 7
4. _______ Find the perimeter of triangle ABC.
   A. 27       B. 35       C. 20       D. 23

5. _______ If DE = 36 and G and H are midpoints of DF and EF, respectively, find the length of DH.
   A. 36       B. 18       C. 9        D. 24

Short Answer:

6. Explain why the following is the converse of the perpendicular Bisector Theorem:
   “If a point is equidistant from the endpoints of a segment, then it is on the perpendicular bisector of the segment.”

   You may use the diagram below to help explain your reasoning:

   A o__________________ o B

   Explanation:

   _____________________________
1. A concrete slump test is used to measure the water content and consistency of concrete mix. Concrete is placed in a mold for a period of time, and then the mold is removed. The distance from the top of the mold to the top of the “slumped” concrete is then evaluated. The shape of the cross section of the slump mold can be modeled by the points A(4,12), B(8,12), C(10,0) and D(2,0).

a. What special type of quadrilateral is ABCD? How did you determine this? Show all of your work that you used to prove what type of quadrilateral the shape is.

b. Describe another way to prove your answer correct.

c. What is the area of the cross section?
2. The framework of a railroad bridge is shown below. In the diagram, $GB \parallel HC$, $AH \parallel BJ$ and $\angle FBA \cong \angle DBC$.

![Railroad bridge diagram]

a. Are you given enough information to prove that $BE \cong HE$? If so, explain how.

b. If $m\angle FBA = 40^\circ$, what are the measures of $\angle BDH$ and $\angle DHF$?

c. Suppose you were given the additional information that $BH$ and $FD$ are perpendicular. What could you conclude about a special quadrilateral? Explain.
Multiple Choice: Choose the correct answer and put the letter on the blank.

1. ______ The diagonals of a parallelogram must
   A. be congruent.  B. be parallel.  C. be perpendicular.  D. bisect each other.

2. ______ A square is ______ a rectangle.
   A. sometimes  B. always  C. never

3. ______ A rhombus is ________ a square.
   A. sometimes  B. always  C. never

4. ______ What type of quadrilateral is shown at the right?
   A. trapezoid  B. rectangle  C. rhombus  D. A, B and C

5. ______ Find the area of a trapezoid with a height of 6 inches and bases of 4 inches and 7 inches.
   A. 17 inches  B. 33 square inches  C. 33 inches  D. 17 square inches

Short Answer:

6. Explain why a square is a parallelogram, a rectangle and a rhombus.

   Explanation:
1. Describe what transformations must take place for shapes A, B and C in order to complete this rectangle.

2. Computerized embroidery machine are used to sew letters and designs on fabric. A computerized embroidery machine can use the same symbol to create several different letters. Which of the letters are rigid transformations of other letters? Explain how a computerized embroidery machine can create these letters from one symbol.
Multiple Choice: Choose the correct answer and put the letter on the blank.

1._______ How many lines of symmetry does this flag of Norway have?  

   A. 0  
   B. 1  
   C. 2  

2._______ What type of rotational symmetry does this flag have?  

   A  90°  
   B. 180°  
   C. none  

3._______ An isometry is ________ a rigid transformation.

   A  sometimes  
   B. always  
   C. never  

4._______ What type of transformation is shown at the right?  

   A. reflection  
   B. rotation  
   C. translation  

5._______ What type of transformation is shown at the right?  

   A. reflection  
   B. rotation  
   C. translation  

Short Answer:

6. Explain why if you rotate and object then reflect it, it is a different result than if you reflected it first and then rotated it.

   Explanation:

   ________________________________________________________________
   ________________________________________________________________