Geometry: Semester 1 Exam Study Guide
#1 - 67 Multiple Choice Questions (1 pt each)
#68 - 76 Free Response (4 pts each)

Vocabulary:

Complementary Angles
Supplementary Angles
Skew Lines
Parallel Lines
Perpendicular Lines
Segment Bisector
Euclid's Undefined Terms
Theorem
Postulate
Axiom
Hypothesis
Conclusion
Negation
Congruent
Regular

Equilateral
Equiangular
Polygon Names: (3 – 12 sided)
Ex: Triangle, Quadrilateral, ...
Distance
Equidistant
Midpoint
Perpendicular Bisector
Median
Altitude
Angle Bisector
Midsegment
Acute Triangle
Obtuse Triangle
Equilateral Triangle

Right Triangle
Isosceles Triangle
Scalene Triangle
Vertical Angles
Corresponding Angles
Alternate Interior Angles
Alternate Exterior Angles
Consecutive Interior Angles
Linear Pair
Collinear
Coplanar
Between
Parallelogram

Theorems/Postulates/Properties:

Segment Addition Postulate
Angle Addition Postulate
Parallel Line Theorems and their Converse
Ex: Corresponding angles ≡ if parallel lines are cut by a transversal
Converse: Lines are parallel if corresponding angles ≡

Reflexive Property
Transitive Property
Symmetric Property
Distributive Property
Addition/Subtraction/Multiplication/Division Properties
Substitution Property
5 Theorems for proving triangles congruent (SSS, SAS, ASA, AAS, IIL)
If two angles are congruent in a triangle, opposite sides are congruent (also know the converse)

Skills:

Find midpoint
Write converse of a given conditional statement
Find sum of the interior angles of convex polygons
Find measures of exterior angles of convex regular polygons
Find missing measures of triangles
Find missing measures given parallel lines cut by a transversal
Find perimeter and area of triangle, square, rectangle, circle, etc.
Find the surface area and volume of a prism
Complete a proof using parallel lines and congruent triangles
GEOMETRY
Review for First Semester Exam

Determine if each statement is true or false.

1. The negation of "Our test is on Monday" is "Our test is not on Monday."
   \( T \)

2. If a conditional statement is true, its converse is also true.
   \( F \)

3. If two lines are cut by a transversal, the corresponding angles are congruent.
   \( T \)

4. The median of a triangle is a line segment that goes from a vertex of the triangle to the midpoint of the opposite side.
   \( F \)

5. Every triangle has three medians.
   \( T \)

6. Medians and altitudes are the same thing.
   \( F \)

7. The altitude of a triangle is also called the height.
   \( T \)

8. If two sides of one triangle are congruent to sides of another triangle, the third sides are also congruent.
   \( T \)

9. If two lines do not intersect, then they are parallel.
   \( F \)

10. A statement that is accepted without proof is a postulate.
    \( T \)

11. A and B are collinear.
    \( F \)

12. E, F, and G are coplanar.
    \( T \)

13. B, C, and D are coplanar.
    \( F \)

14. B, C, D, and G are coplanar.
    \( T \)

15. All the points are coplanar.
    \( F \)

16. BD and DB are the same.
    \( T \)

17. GH and HG are the same.
    \( F \)
19. If \( \angle 1 = 105^\circ \), then \( \angle 3 = 105^\circ \).

20. If \( \angle 2 = 100^\circ \), then \( \angle 4 = 80^\circ \).

21. If \( \angle 3 = 115^\circ \), then \( \angle 2 = 115^\circ \).

22. If \( \angle 1 = 100^\circ \), then \( \angle 5 = 100^\circ \).

Determine if each of the following triangles is congruent. If they are congruent, tell which theorem or postulate you would use to prove them congruent.

23. SSS

24. SAS

25. ASA or AAS

26. HL

27. Not \( \cong \)

28. Not \( \cong \)
Solve for each variable.

29. \( x = 15 \)

30. \( x = 125 \)  
\[ y = 55 \]

31. \( x = 65 \)  
\( y = 115 \)

32. \( x = 60 \)  
\( y = 62 \)

33. \( x = 45 \)  
\( y = 25 \)

34. \( x = 10 \)

35. \( x = 1 \)  
\[ 4x - 16 = 20 \]  
\[ 4x = 4 \]  
\[ x = 1 \]

36. \( x = 85 \)
37. For A(-2, 4) and B(1, 1), find
   a) the slope of \( \overline{AB} \)
      \[
      \frac{1 - 4}{1 - (-2)} = \frac{-3}{3} = -1
      \]
   b) \( \overline{AB} \)
      \[
      \sqrt{(1 - 2)^2 + (1 - 4)^2} = \sqrt{(3)^2 + (3)^2} = \sqrt{9 + 9} = \sqrt{18} = 3\sqrt{2}
      \]
   c) the midpoint of \( \overline{AB} \)
      \[
      \left( \frac{-2 + 1}{2}, \frac{4 + 1}{2} \right) = \left( -\frac{1}{2}, \frac{5}{2} \right)
      \]
   d) the equation of \( \overline{AB} \)
      \[
      y = -1x + b \\
      1 = -1(1) + b \\
      b = 2
      \]
      \[
      Y = -x + 2
      \]
   e) the slope of a line perpendicular to \( \overline{AB} \)
      \[
      m = 1
      \]

38. Which lines, if any, can be proved parallel from the given information.
   a) \( \angle 1 \equiv \angle 2 \) none
   b) \( \angle 2 \equiv \angle 3 \) none
   c) \( \angle 2 \equiv \angle 4 \) \( j \parallel k \)
   d) \( \angle 1 \equiv \angle 6 \) \( j \parallel l \)
   e) \( \angle 4 \equiv \angle 5 \) \( k \parallel l \)
   f) \( m\angle 2 + m\angle 3 = 180^\circ \) \( j \parallel k \)
   g) \( m\angle 3 + m\angle 4 = 180^\circ \) none
   h) \( n \perp j \quad n \perp k \) \( j \parallel k \)
   i) \( j \parallel k \quad k \parallel l \) \( j \parallel l \)
41. Given: \( \overrightarrow{BC} \) bisects \( \angle DBE \)

Prove: \( \angle ABD \cong \angle ABE \)

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<thead>
<tr>
<th>Statements</th>
<th>Reasons</th>
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</thead>
<tbody>
<tr>
<td>1. ( \overrightarrow{BC} ) bisects ( \angle DBE )</td>
<td>1. Given</td>
</tr>
<tr>
<td>2. ( \angle ABD ) and ( \angle DBC ) are a linear pair ( \angle ABE ) and ( \angle EBC ) are a linear pair</td>
<td>2. Definition of Linear Pair</td>
</tr>
<tr>
<td>3. ( \angle ABD ) and ( \angle DBC ) are supplementary ( \angle ABE ) and ( \angle EBC ) are supplementary</td>
<td>3. Linear Pairs are supplementary</td>
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<tr>
<td>4. ( \angle DBC \cong \angle EBC )</td>
<td>4. Definition of Bisect</td>
</tr>
<tr>
<td>5. ( \angle ABD \cong \angle ABE )</td>
<td>5. If 2 ( \angle )s are ( \cong ), then their supplements are ( \cong )</td>
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42. Given:  \( C \) is the midpoint of \( \overline{BD} \)
\[ AC \perp \overline{BD} \]
Prove:  \( \angle B \equiv \angle D \)

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<tr>
<td>1. ( C ) is midpoint ( \overline{BD} ) [ AC \perp \overline{BD} ]</td>
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<tr>
<td>2. ( BC \equiv DC )</td>
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<tr>
<td>3. ( \angle ACB ) and ( \angle ACD ) are right angles</td>
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<tr>
<td>4. ( \angle ACB \equiv \angle ACD )</td>
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<tr>
<td>5. ( AC \equiv AC )</td>
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<tr>
<td>6. ( \triangle ACB \equiv \triangle ACD )</td>
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<td>7. ( \angle B \equiv \angle D )</td>
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<tr>
<td>1. Given</td>
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<td>3. Definition of perpendicular (( \perp ))</td>
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<tr>
<td>4. All right ( \angle )'s are ( \equiv )</td>
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<tr>
<td>5. Reflexive</td>
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<td>6. SAS</td>
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<td>7. CPCTC</td>
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