Review Test 2
Chapters 3, 4, and 5

Answer the following questions. Make a drawing for each situation.

TRIANGLES

- When are two **triangles congruent?**

_____

_____

_____

_____

(Answers: SAS, SSS, ASA, AAS)

- What special case of congruency do you know in the case of **two right triangles**?

(Answer: HL)

- **A triangle is isosceles** if and only if _____.

(Answer: it has two congruent sides)

- **A triangle is isosceles** if and only if _____.

(Answer: it has two congruent angles)

- **A triangle is equilateral** if and only if _____.

(Answer: it has all three sides congruent)

- **A triangle is equilateral** if and only if _____.

(Answer: it has all three angles congruent (each of measure 60 degrees)

- **An exterior angle** of a triangle is greater than _____.

(Answer: either nonadjacent interior angle)

- **The sum of the measures of the angles** of a triangle is _____. (Answer: 180 degrees)

- If the lengths of two sides of a triangle are unequal, then the measures of the angles opposite them are _____and the larger angle is opposite the longer _____.

(Answer: unequal; side)

- If the measures of two angles of a triangle are unequal, then the lengths of _____ are unequal and the longer side is opposite the _____.

(Answer: the sides opposite them; larger angle)

- Given a line and a point not on the line, the _____ is **the shortest segment that can be drawn from the point to the line**.

(Answer: perpendicular segment from the point to be line)

- In any triangle, the **length of one side** is _____ than the sum of the lengths of the other two sides.

(Answer: less)

- **An exterior angle** of a triangle is equal to the sum of _____.

(Answer: the two nonadjacent interior angles)

- **The segment that joins the midpoints of two sides** of a triangle is _____ to the third side and its length is _____.

(Answer: parallel; half of the third side)

- **An angle bisector of a triangle** is _____.

(Answer: the bisector of an angle of the triangle)

- **A median of a triangle** is _____.

(Answer: the segment that joins one vertex with the midpoint of the opposite side)

- **An altitude of a triangle** is _____.

(Answer: the line segment from one vertex perpendicular to the opposite side (or its extension).

- **A perpendicular bisector of a side** of a triangle is _____.

(Answer: the line that is perpendicular to the side at the midpoint).

- **The bisector of one angle** of a triangle divides the opposite side into segments that are _____to the lengths of _____.

(Answer: proportional; the two sides that form the angle).

- If **a line parallel to one side** of a triangle intersects the other two sides in different points, then:

a) two _____ triangles are formed.

(Answer: similar).

b) It divides the sides in _____.

(Answer: equal ratios).

- When are two **triangles similar**?

_____

_____

_____

(Answer: AA, SAS, SSS)

- What is the **Pythagorean theorem**? _____.
The triangle must be _____.

(Answer: $a^2 + b^2 = c^2$, where a and b are legs, and c is hypotenuse; a right triangle)

- What is the **converse of the Pythagorean theorem**? Is it true?

(If $a^2 + b^2 = c^2$, then the triangle is right, with c = hypotenuse; yes)

- What do you know about the **altitude to the hypotenuse** in a right triangle?

- The altitude divides the right triangle into two _____ triangles. Each of these two triangle is also similar to _____.

(Answer: similar ; the given triangle)

- The altitude is the geometric mean of _____.

(Answer: the segments formed on the hypotenuse)

- One leg is the geometric mean of _____

(Answer: the hypotenuse and the adjacent segment on the hypotenuse)

- In a right triangle, a leg opposes a 30 degree angle if and only if its length is _____ of the length of the _____.

(Answer: half; hypotenuse)

PARALLEL LINES CUT BY TRANSVERSALS

- If three or more parallel lines cut congruent segments on one transversal, then they cut _____ on every transversal.

(Answer: congruent segments)

- Three parallel lines cut _____ segments on any two transversals.

(Answer: proportional segments)

QUADRILATERALS

In a parallelogram,

- the opposite sides are _____ and _____.

(Answer: parallel; congruent)

and

- the opposite angles are _____.

(Answer: congruent)

and

- the diagonals are not _____; they are not _____; they _____ each other.

(Answer: congruent; perpendicular; bisect)

and

- the sum of the measures of the angles is _____.

(Answer: 360 degrees)

A quadrilateral is a parallelogram if :

a) two opposite sides are _____ and _____.

(Answer: parallel; congruent)

or

b) both pairs of opposite angles are _____.

(Answer: congruent)

or

c) diagonals _____ each other.

(Answer: bisect each other)

In a rectangle,

- the opposite sides are _____ and _____.

(Answer: parallel; congruent)

and

- all angles are _____, each _____.

(Answer: congruent; 90 degrees)

and

- the diagonals are _____ ; they are not _____;
they _____ each other.

(Answer: congruent; perpendicular; bisect)

and

- the sum of the measures of the angles is _____.

(Answer: 360 degrees)

In a square,

- the opposite sides are _____ and all sides are _____.

(Answer: parallel; congruent)

and

- all angles are _____, each _____.

(Answer: congruent; 90 degrees)

and

- the diagonals are _____ ; they are _____;
  they _____ each other.

(Answer: congruent; perpendicular; bisect)

and

- the sum of the measures of the angles is _____.

(Answer: 360 degrees)

In a rhombus,

- the opposite sides are _____ and _____.

(Answer: parallel; congruent)

and

- the opposite angles are _____.

(Answer: congruent)

and

- the diagonals are not _____; they are _____;
  they _____ each other.

(Answer: congruent; perpendicular; bisect)

and

- the sum of the measures of the angles is _____.

(Answer: 360 degrees)

In a trapezoid,

- one pair of opposite sides are _____ , but not _____.

(Answer: parallel; congruent)

and

- the diagonals are not _____; they are not _____;
  they do not _____ each other.

(Answer: congruent; perpendicular; bisect)

and

- the sum of the measures of the angles is _____.

(Answer: 360 degrees)

- the median is the segment joining the _____.
  and its length is equal to

(Answer: midpoints of the unparallel
sides; half of the sum of the bases)

In an isosceles trapezoid,

- the unparallel sides also known as _____ are _____

(Answer: legs; congruent)

and

- the base angles are _____.

(Answer: congruent)

and

- the diagonals are _____; they do not _____ each other.

(Answer: congruent; bisect)

Review the following problems:

Handout Sections 3.1 & 3.2	Problems 1, 2, 3, 4, 5, 6, 7, 8, 9, 10
Handout Section 3.3	Problems 1, 2, 3, 4
Handout Section 3.5	Problems 1, 2, 3, 4
Handout Sections 4.1 & 4.2	Problems 1, 2, 3
Handout Section 4.4	Problems 1, 2, 3, 4
Quiz #2 and #3	All

Textbook 3.1	Problems 4, 9 – 12	Textbook 4.3	Problems 8, 10, 12, 14, 15, 19
Textbook 3.2	Problems 9, 17, 20	Textbook 4.4	Problems 1, 7, 10, 15, 17, 21
Textbook 3.3	Problems 19, 23, 25, 26	Textbook 5.2	Problems 12, 28, 32, 35
Textbook 4.1	Problems 4, 6, 8	Textbook 5.3	Problems 6, 12, 16, 18, 20, 22, 2
Textbook 4.2	Problems 9, 12, 13, 27, 28	Textbook 5.4	Problems 2, 4, 5, 8, 9, 10, 15, 16, 18, 24, 27

Know the formal proofs of the following theorems:

Handout Section 3.3	Theorems: T 3.3.3, T 3.3.4
Handout Sections 4.1 & 4.2	Theorems: C 2.5.4, T 4.1.1, C 4.1.2, C 4.1.3, C 4.1.4, T 4.2.1, T 4.2.2, T 4.2.3
Handout Section 4.4	Theorems: C 4.4.2
Section 5.2	Property: Given a triangle ABC, MN parallel to BC, M on AB, N on AC, show that triangle AMN is similar to triangle ABC.

Draw a figure and write the hypothesis and conclusion. Mark the figure and write a formal proof.

1) If two line segments are medians of an equilateral triangle, then they are congruent.

2) If the bisector of an angle of a triangle is perpendicular to the opposite side, then the triangle is isosceles.

3) If a line segment is the median from the vertex angle of an isosceles triangle, then it bisects the vertex angle.

4) If the median of a triangle is perpendicular to one of its sides, then the triangle is isosceles.

5) In a triangle if an angle bisector is an altitude, then it is also a median.

Answer true or false:

1) The hypotenuse is the side opposite one of the acute angles in a right triangle. _____

2) An isosceles triangle can have an obtuse angle as one of its angles. _____

3) A right isosceles triangle has two right angles. _____

4) If three angles of one triangle are congruent with three angles of a second triangle, then the two triangles are congruent. _____

5) Triangles can be proved congruent using SSA. _____

6) Corresponding parts of congruent triangles are congruent. _____

7) The median to the base of an isosceles triangle bisects the vertex angle. _____

8) The measure of an exterior angle of a triangle is always greater than the measure of any of its interior angles. _____

9) If two angles of one triangle are congruent to two angles of a second triangle, the third angles are not necessarily congruent. _____

10) If a transversal is perpendicular to one of two parallel lines, it is perpendicular to the other line also. _____

11) If two angles of a quadrilateral are right angles, the quadrilateral is a rectangle. _____

12) A parallelogram is also a trapezoid. _____

13) In a trapezoid, two sides are always parallel. _____

14) If the four sides of a quadrilateral are congruent, it must be a square. _____

15) In a parallelogram, the diagonals bisect the angles. _____

16) In a rhombus, the diagonals bisect the angles. _____

17) Two congruent triangles are also similar. _____

18) Two similar triangles are also congruent. _____

19) If two angles of one triangle are congruent to two angles of a second triangle, then the triangles are similar. _____

20) If an acute angle of a right triangle is congruent to an acute angle of a second right triangle, then the two triangles are similar. _____

21) A line through two sides of a triangle divides the sides proportionally. _____

22) If the three sides of one triangle are parallel, respectively, to three sides of a second triangle, then the triangles are similar. _____

23) Two right triangles are always similar triangles. _____

24) The altitude to the hypotenuse of a right triangle forms two triangles that are similar._____

25) If the hypotenuse of an isosceles right triangle measures $8\sqrt{2}$ inches, then each leg is 8 inches long. _____

26) The three sides of a right triangle could measure 9, 40, and 42 inches. _____

(Answers: 1F, 2T, 3F, 4F, 5F, 6T, 7T, 8F, 9F, 10T, 11F, 12F, 13T, 14F, 15F, 16T, 17T, 18F, 19T, 20T, 21F, 22T, 23F, 24T, 25T, 26F)