Review Test 2
Chapters 3, 4, and 5

Review of the definitions, theorems, and properties learned. Answer the following questions. Make a drawing for each situation. Then translate the statements mathematically.

TRIANGLES

1. When are two **triangles congruent?**

_____   _____

_____   _____

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

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

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

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

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

7. **The measure of an exterior angle** of a triangle is equal to _____.

8. **The sum of the measures of the angles** of a triangle is _____.

9. If two sides of a triangle are congruent, then the angles opposite them are _____

10. 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**.

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

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

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

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

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

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

      a) two _____ triangles are formed.

      b) The line divides the sides in _____.

17. When are two **triangles similar**?

    _____

18. What is the **Pythagorean theorem**? _____.

The triangle must be _____.

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

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

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

    b) The altitude is the geometric mean of _____.

    c) One leg is the geometric mean of _____

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

22. The median from the right angle in a right triangle is _____.

23. In a triangle, the bisector of one angle divides the opposite side into segments that are_____

to the _____.

PARALLEL LINES / PARALLEL LINES CUT BY TRANSVERSALS

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

2. Two lines are parallel if they lie in the same _____ and do not _____.

3. Given two lines with one transversal, then two lines are parallel if and only if

    a) One pair of _____ are congruent.
or
    b) One pair of _____ are congruent.
or
    c) One pair of _____ are congruent.
or
    d) One pair of same-side interior angles are _____.
or
    e) One pair of same-side exterior angles are _____.

4. If two coplanar lines are perpendicular to a third line, then they are _____ to each other.

QUADRILATERALS

<u>In a parallelogram,</u>

     1- the opposite sides are _____ and _____.

and

     2- the opposite angles are _____.

and

     3- the diagonals are not _____; they are not _____;

      they _____ each other.

and

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

<u>5. A quadrilateral is a parallelogram if :</u>

     a) two opposite sides are _____ and _____.

or

     b) both pairs of opposite angles are _____.

or

     c) diagonals _____ each other.

<u>In a rectangle,</u>

6- the opposite sides are _____ and _____.

and

7- all angles are _____, each _____.

and

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

and

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

<u>In a square,</u>

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

and

11- all angles are _____, each _____.

and

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

and

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

In a rhombus,

14- the opposite sides are _____ and _____ .

and

15- the opposite angles are _____ .

and

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

and

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

In a trapezoid,

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

and

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

and

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

21- the median is the segment joining the _____.

and it is _____ to the bases and its length is equal to _____

In an isosceles trapezoid,

22- the unparallel sides also known as _____ are _____

and

23- the base angles are _____.

and

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

25. A trapezoid is isosceles if:

a) _____ are congruent

or

b) _____are congruent.

Answers: **TRIANGLES**
1. SAS, SSS, ASA, AAS   2. HL   3. it has two congruent sides   4. it has two congruent angles
5. it has all three sides congruent   6. it has all three angles congruent (each of measure 60 degrees)
7. the sum of the measures of the two nonadjacent interior angles of the triangle   8. 180 degrees
9. congruent   10. perpendicular segment from the point to the line   11. parallel; half of the third side
12. the bisector of an angle of the triangle   13. the segment that joins one vertex with the midpoint of the opposite side   14. the line segment from one vertex perpendicular to the opposite side (or its extension)   15. the line that is perpendicular to the side at the midpoint   16. similar; equal ratios
17. AA   18. $a^2 + b^2 = c^2$, where a and b are legs, and c is hypotenuse; a right triangle
19. If $a^2 + b^2 = c^2$, then the triangle is right, with c = hypotenuse; yes   20a. similar ; the given triangle
20b. the segments formed on the hypotenuse   20c. the hypotenuse and the adjacent segment on the hypotenuse   21. half; hypotenuse   22. one-half the length of the hypotenuse
23. proportional; two sides that form the angle

Answer: **PARALLEL LINES CUT BY TRANSVERSALS**
1. congruent segments   2. plane; intersect   3a. corresponding angles   3b. alternate interior angles
3c. alternate exterior angles   3d. supplementary   3e. supplementary   4. parallel

Answer: **QUADRILATERALS**
1. parallel; congruent   2. congruent   3. congruent; perpendicular; bisect   4. 360 degrees
5a. parallel; congruent   5b. congruent   5c. bisect each other   6. parallel; congruent
7. congruent; 90 degrees   8. congruent; perpendicular; bisect   9. 360 degrees   10. parallel;
congruent   11. congruent; 90 degrees   12. congruent; perpendicular; bisect   13. 360 degrees
14. parallel; congruent   15. congruent   16. congruent; perpendicular; bisect   17. 360
18. parallel; congruent   19. congruent; perpendicular; bisect   20. 360 degrees
21. midpoints of the unparallel sides; parallel; half of the sum of the bases   22. legs; congruent   23.
congruent   24. congruent; do not   25a. diagonals   25b. two base angles

Review the following problems:

Handout Sections 3.1	Problems 3, 4, 5, 6
Handout Section 4.4	Problems 1,2,3,4
Quiz #2	All
Textbook 3.1	# 15 (same as 6 on handout 3.1) , 16
Textbook 3.2	# 1 – 9, 15, 39, 40
Textbook 3.3	# 28
Textbook 3.4	# 13, 14, 15, 16, 19
Textbook 4.2	# 1, 2, 9, 11, 12, 13
Textbook 4.3	# 27
Textbook 4.4	# 21, 23, 26, 31
Textbook 5.2	# 19, 25, 28, 31,33, 34 , 36, 37
Textbook 5.3	# 3, 5, 7, 9, 10, 11 – 15 , 19, 23
Textbook 5.4	# 16, 19, 26, 28, 31, 45, 47

Know the formal proofs of the following theorems:

Handout Section 3.1	Theorems: T 3.1
Section 3.3	T 3.11, C 3.14
Handout Section 4.1	Theorems: T 4.1, C4.2, T 4.4, T4.5, T4.6, T4.7, T4.8
Section 4.2	Theorem 4.10, T4.11
Section 4.3	Theorems: 4.16, 4.17
Handout Section 4.4	Theorems: T 4.20, T4.21
Section 5.2	Theorem 5.11

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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.   _____

9) An exterior angle of a triangle is the supplement of one of the interior angles of the triangle.____

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

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

    _____

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

13) A parallelogram is also a trapezoid.   _____

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

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

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

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

18) Two congruent triangles are also similar.   _____

19) Two similar triangles are also congruent.   _____

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

21) 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.   _____

22) A line through two sides of a triangle parallel to the third side divides the two sides proportionally.
    _____

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

24) Two right triangles are always similar triangles.   _____

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

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

    _____

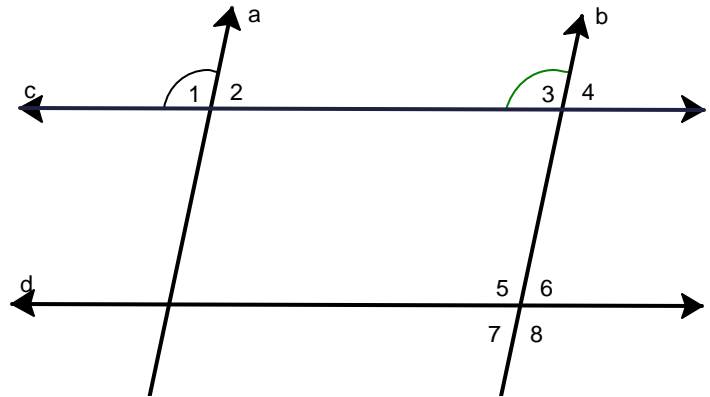27) The three sides of a right triangle could measure 9, 40, and 42 inches.   _____

(Answers: 1F, 2T, 3F, 4F, 5F, 6T, 7T, 9T, 10F, 11T, 12F, 13F, 14T, 15F, 16F, 17T, 18T, 19F, 20T, 21T, 22T, 23T, 24F, 25T, 26T, 27F)

More practice

1. Which lines are parallel if

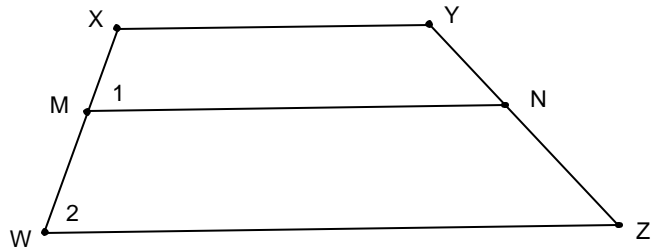   a) $\angle 1 \cong \angle 3$?

        b) $\angle 3 \cong \angle 8$
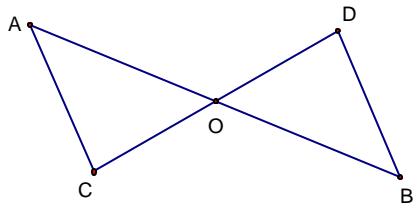
2.   Given: $\overline{XY} \parallel \overline{WZ}$

          $\angle 1 \cong \angle 2$

           Prove: $\overline{MN} \parallel \overline{XY}$
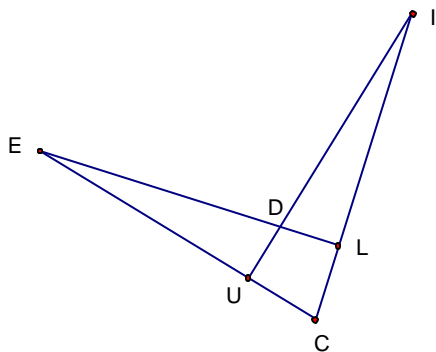
3.

    Given $\overline{AB}$ bisects $\overline{CD}$

            $\overline{CD}$ bisects $\overline{AB}$
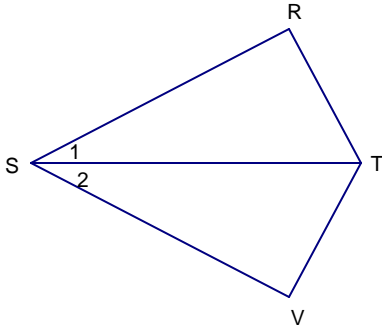
    Prove $\triangle AOC \cong \triangle BOD$

4.

    Given $\overline{IU} \perp \overline{EC}$

           $\overline{EL} \perp \overline{IC}$
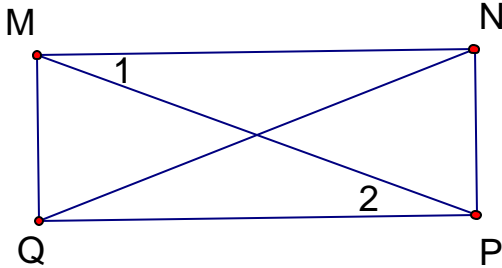
           $\overline{CL} \cong \overline{CU}$

    Prove $\triangle ECL \cong \triangle ICU$

5.

R

S
1
2

T

V

If ∠R and ∠V are right angles and ∠1 ≅ ∠2, prove that △RST ≅△VST .

6. In a right triangle *FDG* with right angle *D*, the bisector of angle *D* intersects the hypotenuse at *E*. The acute angles of the triangle are congruent. Prove that *E* is the midpoint of the hypotenuse.
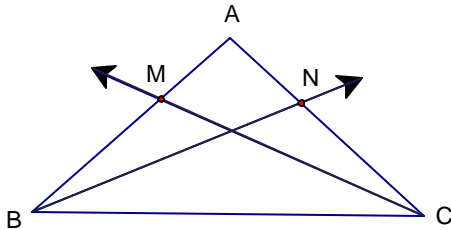
7

M
1

N

Q

2

P

Given ∠1 ≅ ∠2
$\overline{MN} \cong \overline{QP}$

Prove $\overline{MQ} \parallel \overline{NP}$

8.

A
M
N

B

C

Given ∠ABC ≅ ∠ACB
$\overrightarrow{BN}$ bis ∠ABC
$\overrightarrow{CM}$ bis ∠ACB

Prove △BMC ≅△CNB

9. (3.3 - #18) In an isosceles triangle ABC (base $\overline{BC}$), $m\angle B = 68°$. If the angle bisectors of angles B and C intersect at O, find the measure of the angle BOC. Find the measure of the angle formed by the angle bisectors of ∠B and ∠C .

10.   Given: RSTV trapezoid
        $\overline{RV} \parallel \overline{ST}$

        $m\angle SRV = 90°$
        M, N midpoints
        ST = 13 in, RV = 17 in, RS = 16 in
     Find: RN.

R

V

M

N

S

T