

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:
- two _____ triangles are formed.
 - 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?
- The altitude divides the right triangle into two _____ triangles. Each of these two triangles is also similar to _____.
 - The altitude is the geometric mean of _____.
 - 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

In a parallelogram,

- 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 _____.

5. A quadrilateral is a parallelogram if :

- a) two opposite sides are _____ and _____
 or
 b) both pairs of opposite angles are _____.
 or
 c) diagonals _____ each other.

In a rectangle,

- 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 _____.

In a square,

- 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

Answers: 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

Answers: 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 :

- Handout Sections 3.1 Problems 4, 6
 Handout Chapter 3 – Applications
 Handout Section 4.1
 Handout Chapter 4 – Applications Problems 1, 2, 3, 5
 Handout Section 4.4
 Quiz #2
 Homework #4
 Textbook 5.2 # 19, 25, 31, 33, 36, 37
 Textbook 5.3 # 3, 5, 7, 9, 10, 11 – 15, 19, 23
 Textbook 5.4 # 15, 19, 27, 31, 45, 47

Know the formal proofs of the following theorems:

- Handout Section 3.1 Theorem: T 3.1
 Section 3.3 T 3.11, C 3.14
 Handout Section 4.1 Theorems: C4.2, T 4.4, T4.5, T4.6, T4.7, T4.8
 Section 4.2 Theorem 4.10, T4.11
 Handout Section 4.4 Theorems: T4.21, Theorem 2/page 4 (If the diagonals of a trapezoid are
 congruent, then the trapezoid is isosceles.)
 Section 5.2 Theorem 5.11

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. _____

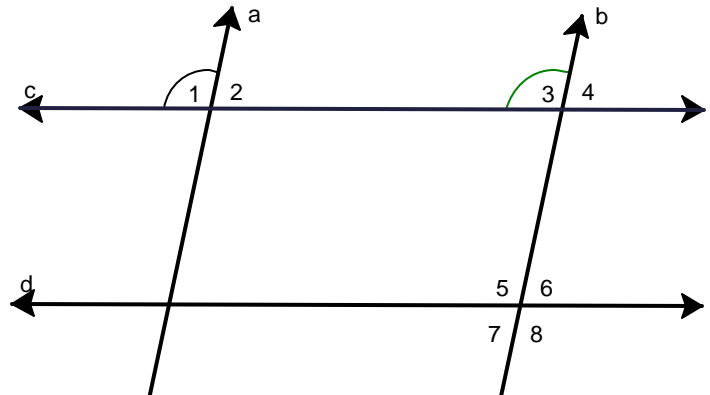
(Answers: 1F, 2T, 3F, 4F, 5F, 6T, 7T, 9T, 10F, 11T, 12F, 13F, 14T, 15F, 16F, 17T, 18T, 19F, 20T, 21T, 22T, 23T, 24F, 25T, 26T, 27F)

More practice

1. Which lines are parallel if

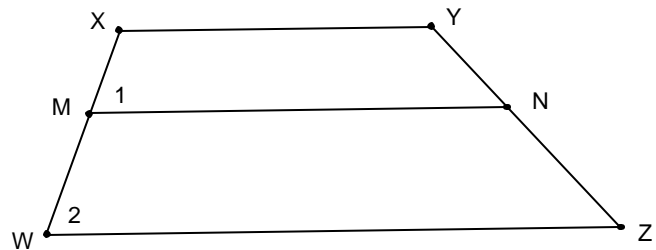
a) $\angle 1 \cong \angle 3$?

b) $\angle 3 \cong \angle 8$

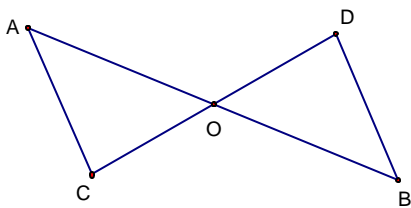


2. Given: $\overline{XY} \parallel \overline{WZ}$
 $\angle 1 \cong \angle 2$

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



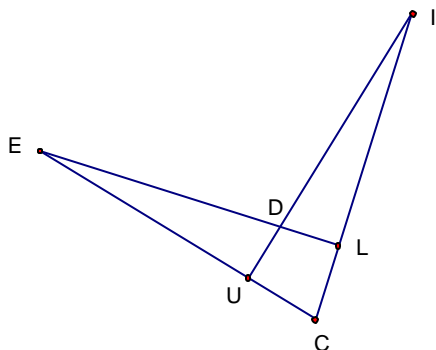
3.



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

Prove $\triangle AOC \cong \triangle BOD$

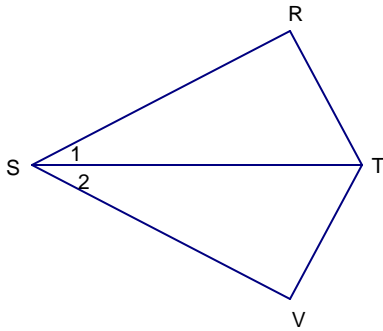
4.



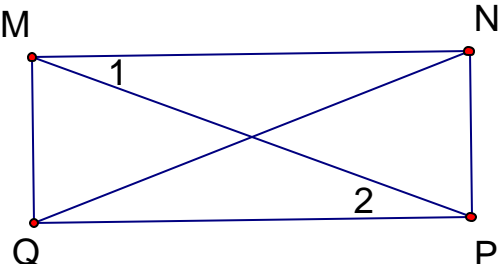
Given $\overline{IU} \perp \overline{EC}$
 $\overline{EL} \perp \overline{IC}$
 $\overline{CL} \cong \overline{CU}$

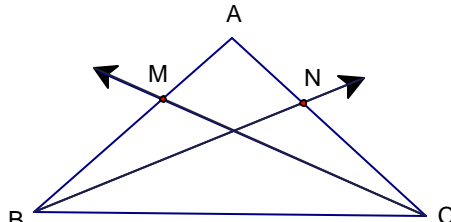
Prove $\triangle ECL \cong \triangle ICU$

5. If $\angle R$ and $\angle V$ are right angles and $\angle 1 \cong \angle 2$, prove that $\triangle RST \cong \triangle VST$.



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.  Given $\angle 1 \cong \angle 2$
 $\overline{MN} \cong \overline{QP}$
 Prove $\overline{MQ} \parallel \overline{NP}$

8.  Given $\angle ABC \cong \angle ACB$
 \overline{BN} bis $\angle ABC$
 \overline{CM} bis $\angle ACB$
 Prove $\triangle BMC \cong \triangle CNB$

9. Given: RSTV trapezoid
 $\overline{RV} \parallel \overline{ST}$
 $m\angle SRV = 90^\circ$
 M, N midpoints
 ST = 13 in, RV = 17 in, RS = 16 in
 Find: RN.

