

MATHEMATICS 1010

GEOMETRY REVIEW

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GEOMETRY REVIEW

This LightUnit contains the definitions, postulates, theorems, and other information that you have studied in the previous nine LightUnits. Review activities for you to complete are included in each section. If you have trouble completing

any of the review activities, you should go back to the original LightUnit and restudy the sections that you are not sure of. When you have completed this review, you will be ready to take the final examination for geometry.

OBJECTIVES

Read these objectives. The objectives tell you what you will be able to do when you have successfully completed this LightUnit.

When you have completed this LightUnit, you should be able:

1. To name, sketch, and label geometric figures.
2. To write and identify conditional sentences and their converse, inverse, and contrapositive.
3. To make and use truth tables.
4. To calculate linear and angle measures.
5. To prove geometric theorems using definitions, postulates, and properties.
6. To identify congruent figures and apply the properties of congruence.
7. To identify similar figures and apply the properties of similarity.
8. To identify and sketch parts of circles.
9. To construct geometric figures using only a compass and straightedge.
10. To sketch and name figures that meet locus conditions.
11. To calculate area and volume of geometric figures.
12. To sketch geometric figures on the coordinate axes.
13. To use algebraic notation to solve geometric distance, slope, and midpoint problems.

Survey the LightUnit. Ask yourself some questions about this study. Write your questions here.

SECTION OBJECTIVES

Read these objectives. When you have completed this section, you should be able:

II. TRIANGLES, QUADRILATERALS, POLYGONS, AND CIRCLES

5. To prove geometric theorems using definitions, postulates, and properties.
6. To identify congruent figures and apply the properties of congruence.
7. To identify similar figures and apply the properties of similarity.
8. To identify and sketch parts of circles.

This section will review definitions, postulates, and theorems about geometric figures and their properties. The figures will include triangles, quadrilaterals, polygons, and circles.

CONGRUENT TRIANGLES AND QUADRILATERALS

Most of the material goods we use today are mass-produced by the thousands. They all look more or less alike; they are the same size and the same shape. Figures that are the same size and the same shape are called congruent figures.

DEFINITIONS

Congruent triangles: two triangles in which the six parts (angles and sides) of one are equal to the corresponding six parts of the other.

Included angle: the angle formed by two sides of a triangle. The angle is included between the two sides.

Included side: the side of a triangle that is the common side of two angles. The side is included between the two angles.

Isosceles triangle: a triangle with at least two sides equal.

Altitude of a triangle: a segment from a vertex perpendicular to the opposite side.

Median of a triangle: a segment from a vertex to the midpoint of the opposite side.

Parallelogram: a quadrilateral with both pairs of opposite sides parallel.

Rectangle: a parallelogram with four right angles.

Rhombus: a parallelogram with all sides equal.

Square: a rectangle with all sides equal.

Trapezoid: a quadrilateral with exactly one pair of sides parallel.

Median of a trapezoid: the segment connecting the midpoint of the legs.

Isosceles trapezoid: a trapezoid with legs of the same length.



The next four postulates listed relate to congruent triangles. Because parallelograms can be divided into congruent triangles, these postulates also relate to certain quadrilaterals.

POSTULATES

- P11: If three sides of one triangle are equal to three sides of another triangle, then the triangles are congruent. (SSS)
- P12: If two sides and the included angle of one triangle are equal to two sides and the included angle of another triangle, then the triangles are congruent. (SAS)
- P13: If two angles and the included side of one triangle are equal to two angles and the included side of another triangle, then the triangles are congruent. (ASA)
- P14: If the hypotenuse and a leg of one right triangle are equal to the hypotenuse and leg of another right triangle, then the triangles are congruent. (HL)

Theorem 4-14, included among the following theorems, is the theorem that allows triangle postulates and theorems to be applied to parallelograms. Be sure you can prove each theorem reviewed.

THEOREMS

- 4-1 If two angles and a non-included side of one triangle are equal to the corresponding parts of another triangle, then the triangles are congruent. (AAS)
- 4-2 If two legs of one right triangle are equal to two legs of another right triangle, then the triangles are congruent. (LL)
- 4-3 If the hypotenuse and an acute angle of one right triangle are equal to the hypotenuse and an acute angle of another right triangle, then the triangles are congruent. (HA)
- 4-4 If a leg and an acute angle of one right triangle are equal to a leg and an acute angle of another right triangle, then the triangles are congruent. (LA)
- 4-5 The altitude to the base of an isosceles triangle bisects the base.
- 4-6 The base angles of isosceles triangles are equal.
- 4-7 The altitude to the base of an isosceles triangle bisects the vertex angle of the triangle.
- 4-8 If two angles of a triangle are equal, then the sides opposite them are equal.
- 4-9 If two sides of a triangle are not equal, then the angle opposite the longer side is the larger angle.
- 4-10 If two angles of a triangle are not equal, then the side opposite the larger angle is the longer side.
- 4-11 The sum of the lengths of any two sides of a triangle is greater than the length of the third side.
- 4-12 If two sides of one triangle are equal to two sides of another triangle but the included angle of the first is larger than the included angle of the second, then the third side of the first triangle is longer than the third side of the second triangle.

- 4-13 If two sides of one triangle are equal to two sides of another triangle but the third side of the first triangle is longer than the third side of the second triangle, then the included angle of the first is larger than the included angle of the second.
- 4-14 If a diagonal is drawn in a parallelogram, then two congruent triangles are formed.
- Corollary 1: Opposite angles of a parallelogram are equal.
- Corollary 2: Opposite sides of a parallelogram are equal.
- Corollary 3: Two parallel lines are equidistant apart throughout.
- 4-15 The diagonals of a parallelogram bisect each other.
- 4-16 If two sides of a quadrilateral are equal and parallel, then the quadrilateral is a parallelogram.
- 4-17 If both pairs of opposite sides of a quadrilateral are equal, then the quadrilateral is a parallelogram.
- 4-18 If the diagonals of a quadrilateral bisect each other then the quadrilateral is a parallelogram.
- 4-19 If the midpoints of two sides of a triangle are connected, the segment is parallel to the third side and equals half the length of the third side.
- 4-20 The diagonals of a rectangle are equal.
- 4-21 The diagonals of a rhombus are perpendicular.
- 4-22 The diagonals of a rhombus bisect two angles of the rhombus.
- 4-23 The median of a trapezoid is parallel to the bases and its length is half the sum of the lengths of the bases.
- 4-24 Base angles of isosceles trapezoids are equal.
- 4-25 The diagonals of an isosceles trapezoid are equal.

➔ Name the corresponding parts of $\triangle ABC \cong \triangle TSR$. Hint: Draw a sketch if needed.

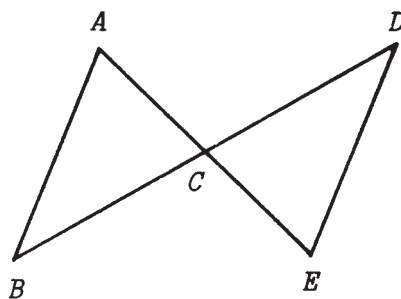
- | | | |
|-----|------------|-------|
| 2.1 | $\angle A$ | _____ |
| 2.2 | $\angle C$ | _____ |
| 2.3 | $\angle S$ | _____ |
| 2.4 | TR | _____ |
| 2.5 | TS | _____ |
| 2.6 | BC | _____ |



Complete the proofs.

2.7 Given: $\overline{AB} \parallel \overline{DE}, AC = CE$

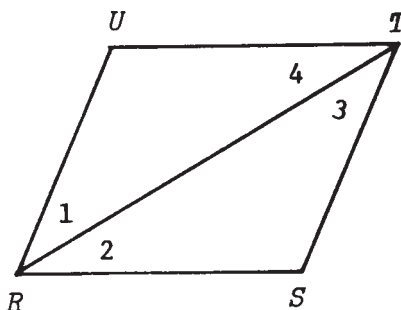
Prove: $\triangle ABC \cong \triangle EDC$



STATEMENT	REASON
1. _____	_____
2. _____	_____
3. _____	_____

2.8 Given: $\overline{UT} \parallel \overline{RS}, UT = RS$

Prove: $\angle S = \angle U$



STATEMENT	REASON
1. _____	_____
2. _____	_____
3. _____	_____
4. _____	_____
5. _____	_____