**Part A:** 2.1 – 2.4

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Unit 2A: Similarity, Congruence and Proofs

**Period: \_\_\_\_\_**

**2018 – 2019 Geometry**

**Pebblebrook High School – Deuire**

**Vocabulary Builder**

**Choose the word from the list below that best matches each sentence.**

intersect parallel perpendicular transversal

1. Two lines in the same plane that never intersect \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

2. A line that crosses two lines in the same plane at two different points \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

3. What two lines that cross at a point do \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

4. Two lines that cross at a angle \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

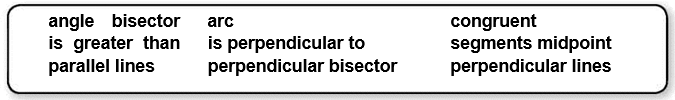
**Use a word from the list above to complete each sentence.**

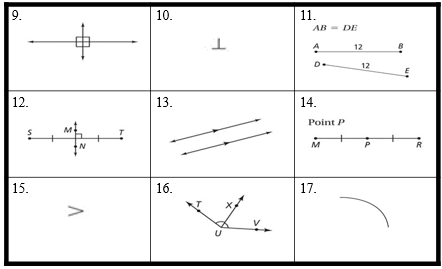
5. The symbol is used to show that lines are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

6. If two lines are parallel to the same line, they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to each other.

7. The symbol is used to show that lines are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8. Parallel lines are lines that never \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

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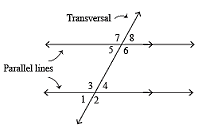


**2-1 Parallel Lines and Transversals**

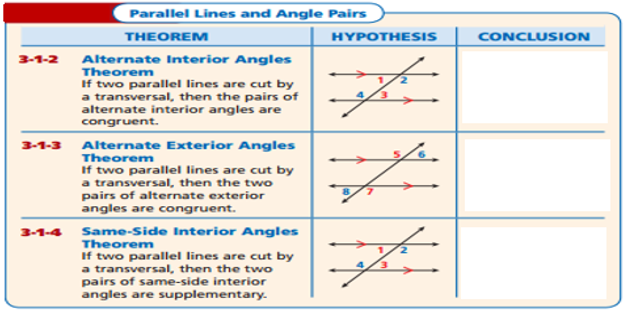
A line that intersects two or more lines in a plane

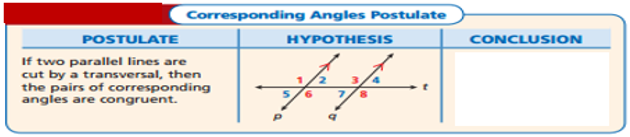
At a different point is called a **transversal**.

Eight angles are formed by a transversal and two lines.

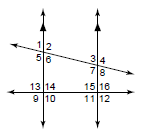


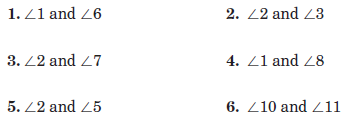
|  |  |  |
| --- | --- | --- |
| **Types of Angles** | | |
| **Angle** | **Definition** | **Examples** |
| Interior | lie between the two lines |  |
| Alternate Interior | On opposite sides of the transversal |  |
| Consecutive Interior | On same side of the transversal |  |
| Exterior | Lie outside the two lines |  |
| Alternate Exterior | On opposite sides of the transversal |  |



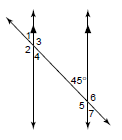


**Example 1**

Identify each pair of angles as alternate interior, alternate exterior, consecutive interior, or vertical.



**Example 2**

Find the measure of each angle. Give a reason for each answer.



**7.**

**8.**

**9.**

**10.**

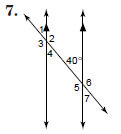
Suppose two lines in a plane are cut by a transversal. With enough information about the angles that are formed, you can decide whether the two lines are parallel.

If two parallel lines are cut by a transversal then the following pairs of angles are congruent:

* **\_\_\_corresponding angles\_\_\_\_\_\_\_**
* **\_\_\_alternate interior angles\_\_\_\_**
* **\_\_\_alternate exterior angles\_\_\_\_**

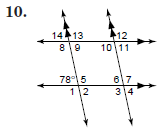
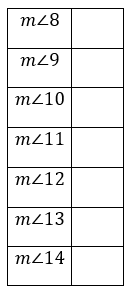
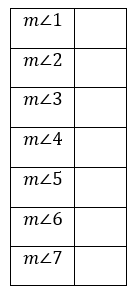
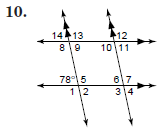
If two parallel lines are cut by a transversal then **consecutive** interior angles are **supplementary**.

**Example 3**

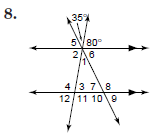
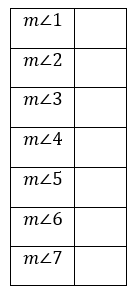
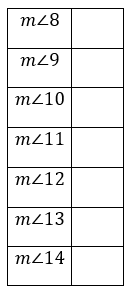
Find the measure of each numbered angle.

**11.**

|  |  |
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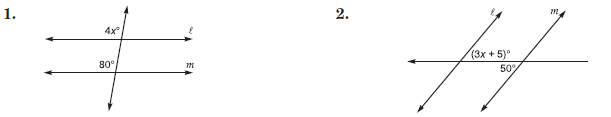


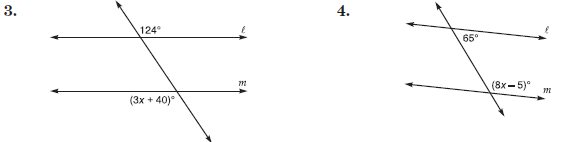
**12.**



**13.**

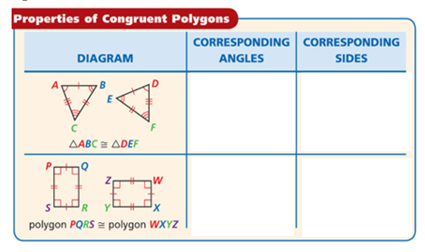
**Example 4**

Find the value of x.

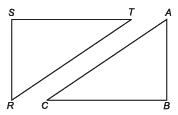
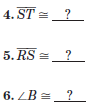
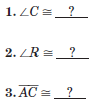


**2-2 Congruent Triangles**

Geometric figures are congruent if they are the same shape and size. **Corresponding angles** and **corresponding sides** are in the same position in polygons with an equal number of sides. Two polygons are **congruent** if and only if their corresponding sides and angles are congruent.

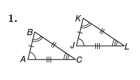


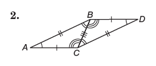
**Example 1**

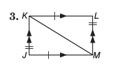
If ΔRST ≅ ΔABC, use arcs and slash marks to show the congruent angles and sides. Complete the congruence statement.

**Example 2**

Show that the polygons are congruent by identifying all congruent corresponding parts. Then write a congruence statement.

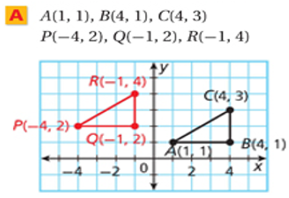


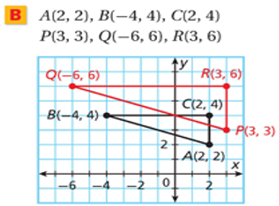




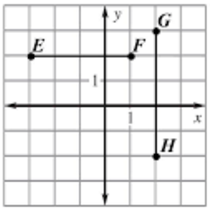
* **Rigid motion**, also known as an **isometry**, preserve **angle measure** and **lengths** of line segments. This means that when a rigid motion is performed on a figure, the corresponding sides and angles of the **image** and the **pre-image** are **congruent**.
* You can determine whether some figures are congruent by determining what type of **transformation** can be applied to one figure to produce the other figure.

**Example 3**

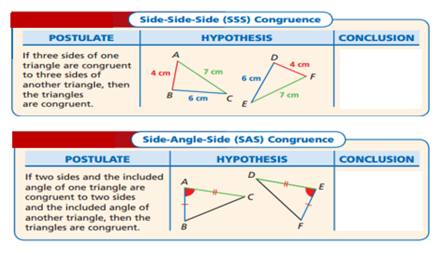
Determine whether the polygons with the given vertices are congruent.



Determine whether the polygons with the given vertices are congruent.

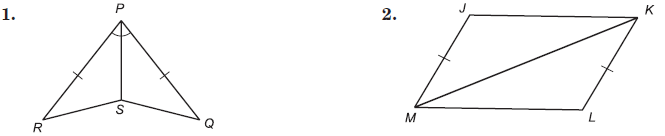


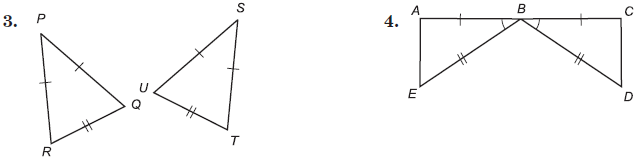
* Two triangles are **congruent** if all of their corresponding **angles** are congruent and all of their corresponding **sides** are congruent. However, you do not need to know the measure of every side and angle to show that two triangles are **congruent**.

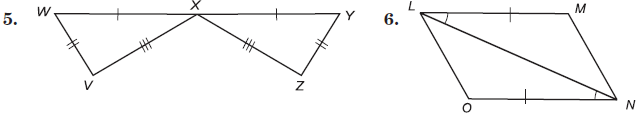


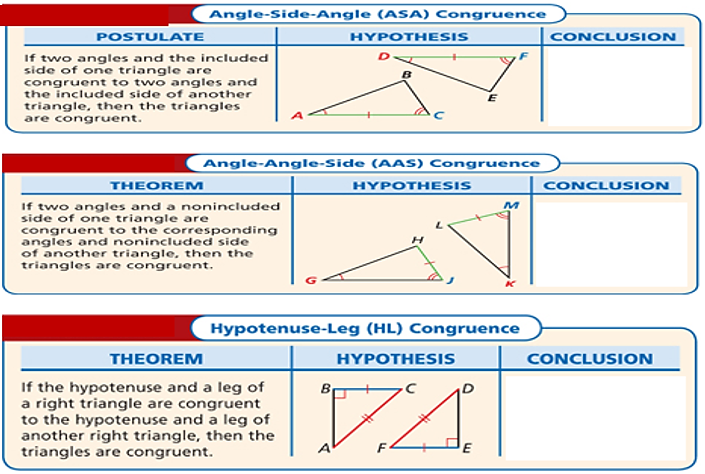
**Example 4**

Determine whether each pair of triangles is congruent. If so, write a congruence statement and explain why the triangles are congruent.



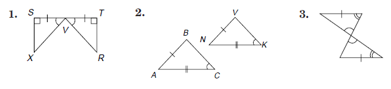


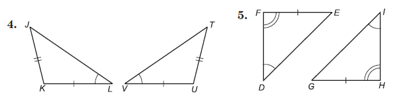


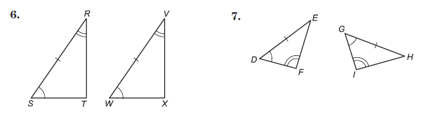


**Example 5**

Determine whether each pair of triangles is congruent. If so, write a congruence statement and explain why the triangles are congruent.

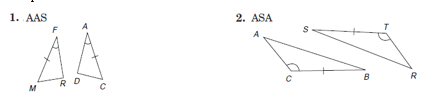






**Example 6**

Name the additional congruent parts needed so that the triangles are congruent by the postulate or theorem indicated.





**2-3 Similar Figures**

* A **ratio** is a comparison of two quantities. The ratio of *a* to *b* can be expressed as , where *b* is not **= 0.**
* An equation stating that two rations are equal is a **proportion**.
* In any true proportion, the cross products are **equal**. So if and only if ***ad = cb***.

**Example 1**

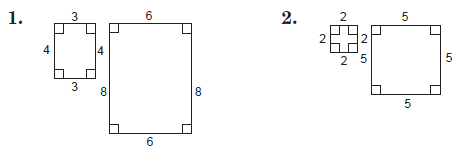
Write each ratio in simplest form.

Solve each proportion.

* Figures that are **similar** have the same **shape** but not necessarily the same **size.**
* To prove a figure is similar, their corresponding angles must be **congruent** and their corresponding sides must be **proportional.**

**Example 2**

Determine whether each pair of polygons are similar.

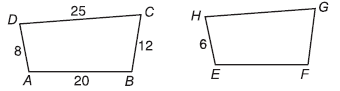


If each pair of polygons is similar, find the values of x and y.

* A **similarity statement** can be written to show that polygons are similar.
* The symbol means similar to.
* A **similarity ratio** is a ratio that compares the **lengths** of the corresponding sides of two similar polygons. The ration is written in the same order as the similarity statement.

**Example 3**

If quadrilateral ABCD is similar to quadrilateral EFGH, find each of the following.

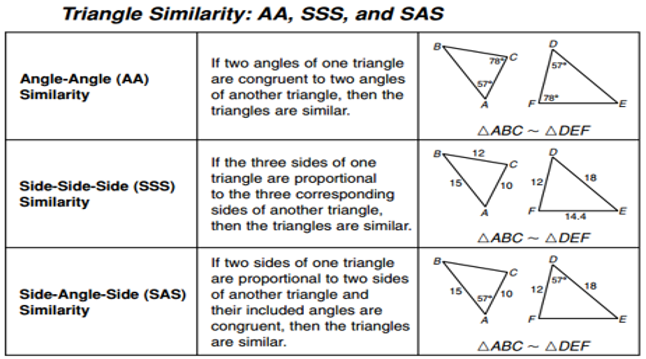




**Example 4**

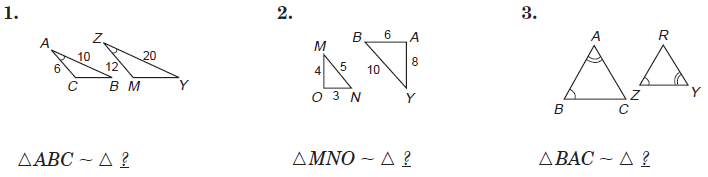
Each pair of polygons is similar. Find the value of x.

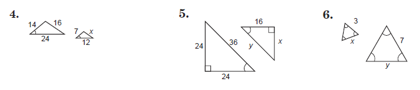




**Example 5**

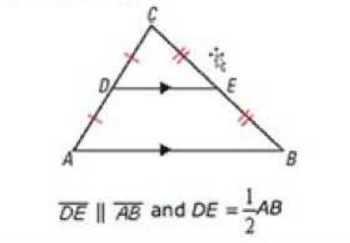
Determine whether each pair of triangles is similar. If so, tell which similarity test is used and complete the statement.

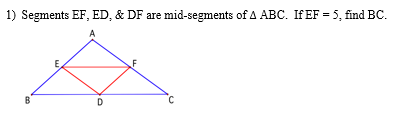


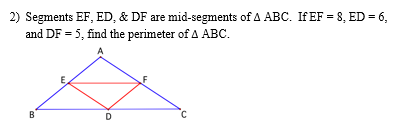
Find the value of each variable.

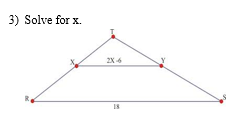
**Triangle Mid-Segment Theorem**

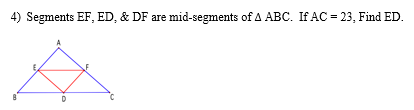
**If a segment joins the midpoints of two sides of a triangle, then the segment is parallel to the third side, and is half its length.**

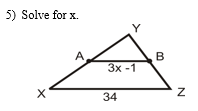


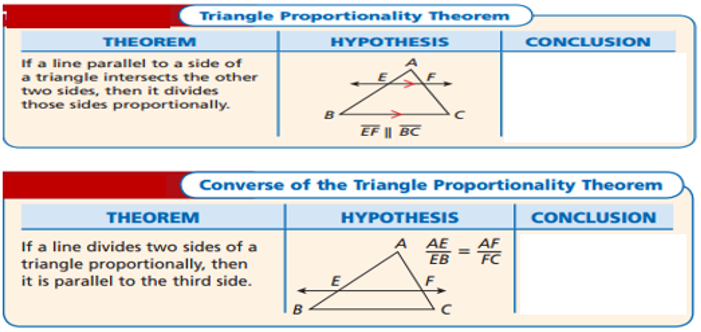
**Example 6**

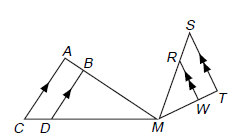




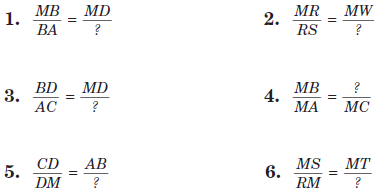




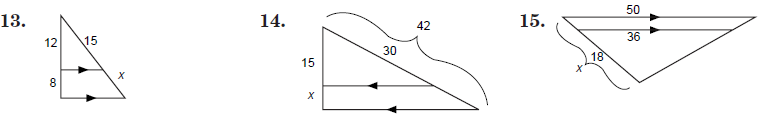


**Example 7**

Complete each proportion.



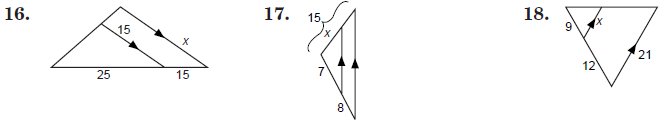
**Example 8**

Find the value of x.

**7.**

**9.**

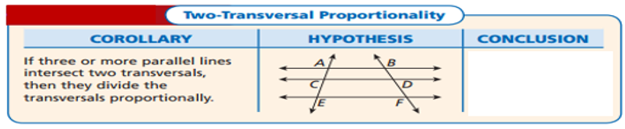
**8.**



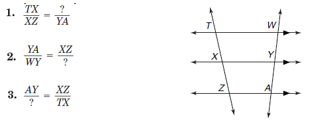
**12.**

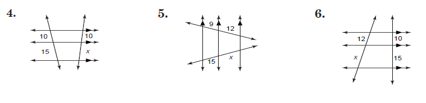
**11.**

**10.**



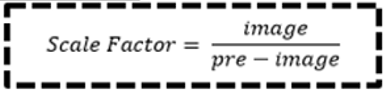
**Example 9**

Complete the proportion.

Find the value of x.

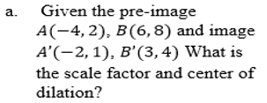
**2-4 Dilations and Similarity**

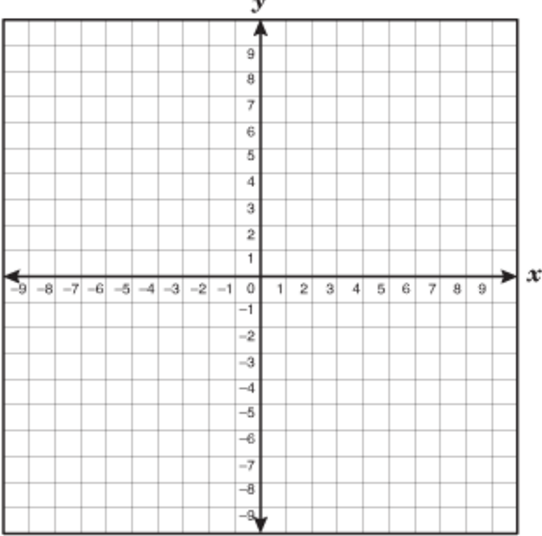
* A **dilation** is a transformation that moves the points of a line, line segment, or figure either toward or away from a point called the **center of dilation**. The center of dilation can be any point **inside** the figure, **on** the figure, or **outside** the figure.
* Dilation produce **similar** figures.
* Like rigid motions, dilations preserve **angle measure**. Unlike rigid motions, dilation do not preserve the **length** of line segments. Instead, they produce a figure with sides that are **proportional** to the sides of the pre-image.
* To dilate, **multiply** the coordinates of the pre-image by a **scale factor** to obtain the coordinates of the image.

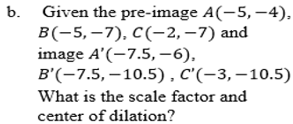


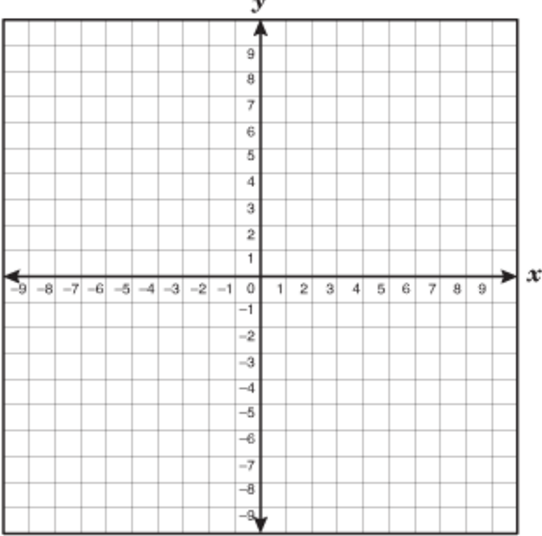
* If the scale factor is greater than 1, then it is a(n) **enlargement**. If the scale factor is less than 1, then it is a **reduction**.

**Example 1**

Find the center of dilation and scale factor.

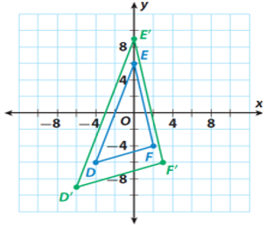


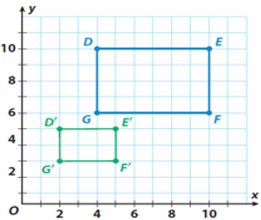




**Example 2**

Find the center of dilation and scale factor.





A **vertical scaling** multiplies/divides every **y-coordinate** by a constant while leaving the x-coordinate unchanged. A **horizontal scaling** multiplies/divides every **x-coordinate** by a constant while leaving the y-coordinate unchanged. The vertical and horizontal scaling can be combined into one question.

**Example 3**

