

Name: \_\_\_\_\_  
Geometry

Date: \_\_\_\_\_  
Band: \_\_\_\_\_

### Unit 3: Parallel and Perpendicular Lines Study Guide

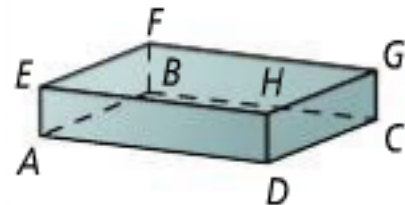
**LT#1:** Identify relationships between figures in space.

Name one pair of each of the segments or planes. Lines and planes that appear to be parallel are parallel.

1. parallel segments

2. skew segments

3. parallel planes



**LT#2:** Identify angles formed by two lines and a transversal.

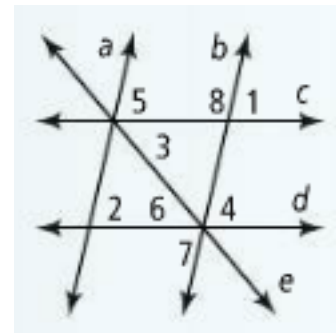
Identify all numbered angle pairs that form the given type of angle pair. Then name the two lines and transversal that form each pair.

4. alternate interior angles

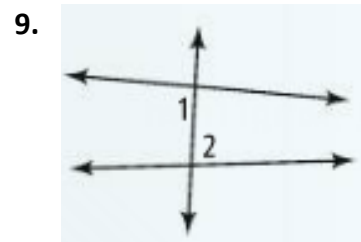
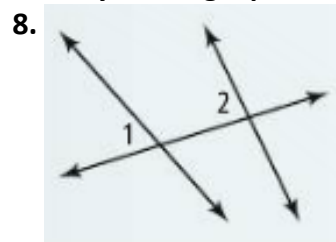
5. same-side interior angles

6. corresponding angles

7. alternate exterior angles



Classify the angle pair formed by  $\angle 1$  and  $\angle 2$ .

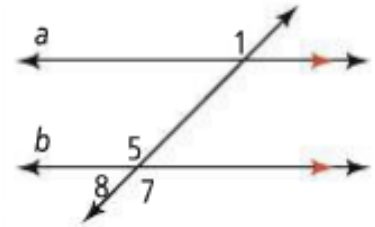


**LT#3:** Prove theorems about parallel lines.

Write a two-column, paragraph, or flow chart proof.

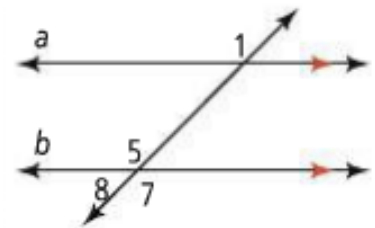
10. Given:  $a \parallel b$

Prove:  $\angle 1$  and  $\angle 8$  are supplementary.



11. Given:  $a \parallel b$

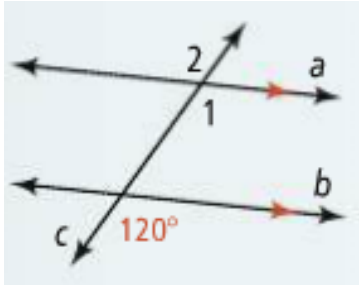
Prove:  $\angle 1 \cong \angle 7$



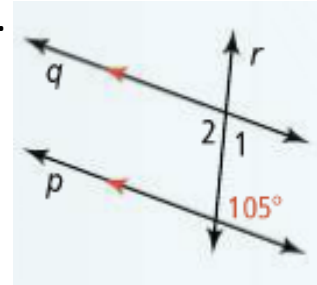
**LT#4:** Use properties of parallel lines to find angle measures.

Find  $m\angle 1$  and  $m\angle 2$ . Justify your answers.

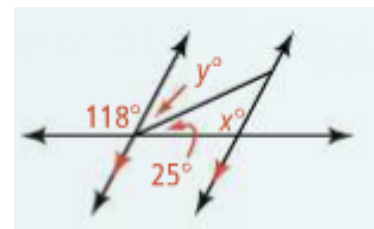
12.



13.

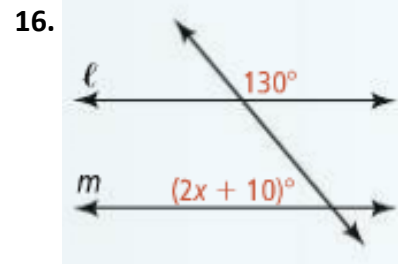
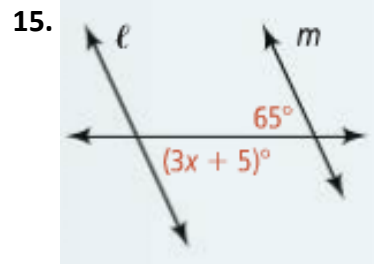


14. Find the values of  $x$  and  $y$  in the diagram below.



**LT#5:** Determine whether two lines are parallel.

Find the value of  $x$  for which  $l \parallel m$ .



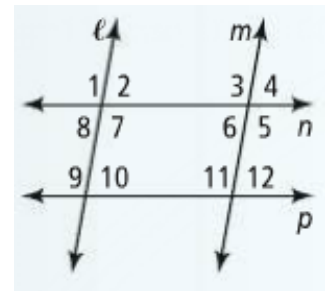
Use the given information to decide which lines, if any, are parallel. Justify your conclusions.

17.  $\angle 1 \cong \angle 9$

18.  $m\angle 3 + m\angle 6 = 180$

19.  $m\angle 2 + m\angle 3 = 180$

20.  $\angle 5 \cong \angle 11$

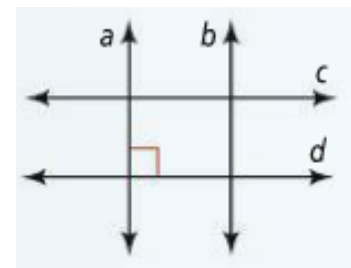


**LT#6:** Relate parallel and perpendicular lines.

Use the diagram at the right to complete each statement.

21. If  $b \perp c$  and  $b \perp d$ , then  $c$  \_\_\_\_  $d$ .

22. If  $c \parallel d$ , then \_\_\_\_  $\perp c$ .



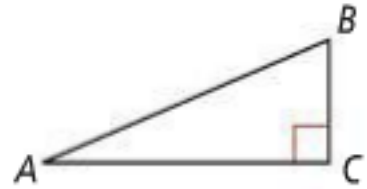
23. Morris Avenue intersects both 1<sup>st</sup> Street and 3<sup>rd</sup> Street at right angles. 3<sup>rd</sup> Street is parallel to 5<sup>th</sup> Street. How are 1<sup>st</sup> Street and 5<sup>th</sup> Street related? Explain.

**LT#7:** Use parallel lines to prove a theorem about triangles.

Write a two-column, paragraph, or flow chart proof.

**24. Given:**  $\triangle ABC$  with right angle  $C$

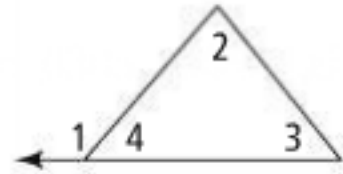
**Prove:**  $\angle A$  and  $\angle B$  are complementary.



**25. Prove the Triangle Exterior Angles Theorem.**

**Given:**  $\angle 1$  is an exterior angle of the triangle.

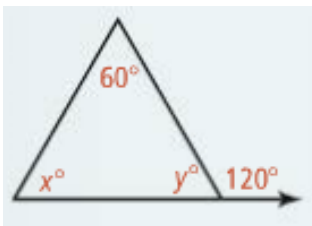
**Prove:**  $m\angle 1 = m\angle 2 + m\angle 3$



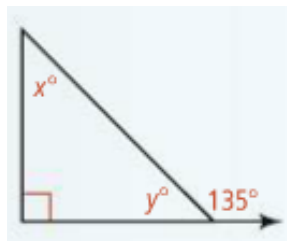
**LT#8:** Find measures of angles of triangles.

Find the values of the variables.

26.



27.



The measures of the three angles of a triangle are given. Find the value of  $x$ .

28.  $x, 2x, 3x$

29.  $x + 10, x - 20, x + 25$

30.  $20x + 10, 30x - 2, 7x + 1$

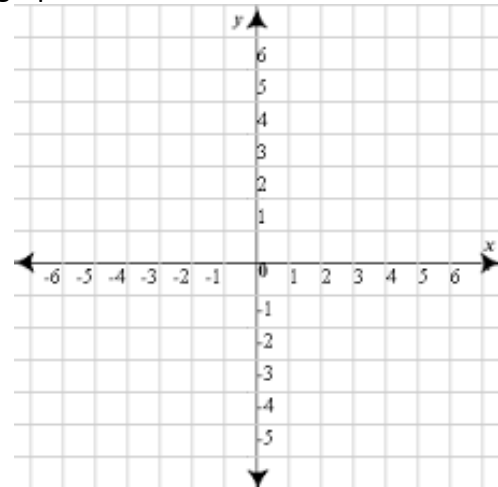
**LT#9:** Graph and write linear equations.

Find the slope of the line passing through the points.

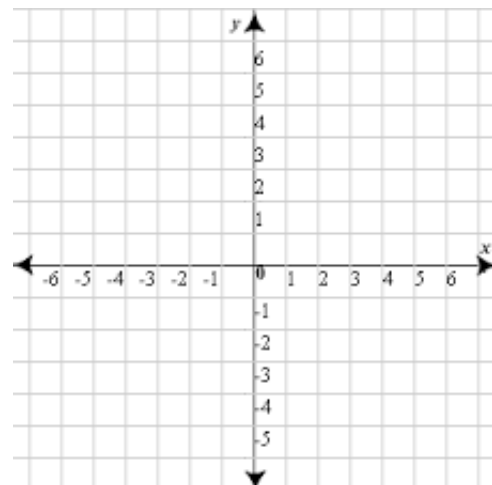
31.  $(6, -2), (1, 3)$

32.  $(-7, 2), (-7, -5)$

33. Name the slope and  $y$ -intercept of  $y = 2x - 1$ . Then graph the line.



34. Name the slope and point on  $y - 3 = -2(x + 5)$ . Then graph the line.



**Write an equation of the line.**

**35.** slope  $-\frac{1}{2}$ ,  $y$ -intercept 12

**36.** slope 3, passes through  $(1, -9)$

**37.** passes through  $(4, 2)$  and  $(3, -2)$

**LT#10:** Relate slope to parallel and perpendicular lines.

Determine whether  $\overline{AB}$  and  $\overline{CD}$  are *parallel*, *perpendicular*, or *neither*.

**38.**  $A(-1, -4), B(2, 11), C(1, 1), D(4, 10)$

**39.**  $A(2, 8), B(-1, -2), C(3, 7), D(0, -3)$

**40.**  $A(-3, 3), B(0, 2), C(1, 3), D(-2, -6)$

**41.**  $A(-1, 3), B(4, 8), C(-6, 0), D(2, 8)$

**42.** Write an equation of the line parallel to  $y = 8x - 1$  that contains  $(-6, 2)$ .

**43.** Write an equation of the line perpendicular to  $y = \frac{1}{6}x + 4$  that contains  $(3, -3)$ .