

Name: _____

Date: _____

MORE WORK WITH PARALLEL LINES N-GEN MATH[®] 8



In the last lesson we saw how two **parallel lines** crossed by a **transversal line** create eight angles. These angles have special relationships and terminology that we will look at in this lesson.

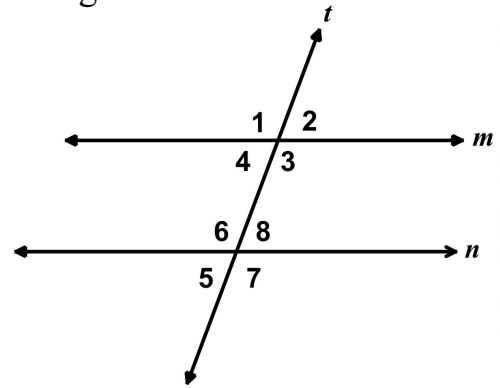
Exercise #1: In the diagram below line m is parallel to line n . In symbols, we would say $m \parallel n$. They are crossed by transversal line t creating the eight numbered angles below.

- (a) Angles located in the same relative position on the two parallel lines are known as **corresponding angles**. Fill in the following:

$\angle 1$ corresponds to _____

$\angle 2$ corresponds to _____

$\angle 3$ corresponds to _____ $\angle 4$ corresponds to _____



- (b) What is true about the measures of corresponding angles? (c) If $m\angle 1 = 110^\circ$ then write in the measures of all other angles on the diagram.

Exercise #2: When the eight angles are formed, four of them lie “inside” the parallel lines and are called **interior**. Four of them lie on the “outside” of the parallel line and are called **exterior**.

- (a) Name all of the **interior angles** from the above diagram. (b) Name all of the **exterior angles** from the above diagram.

Exercise #3: Angles can either be on the **same side** of the transversal or on **alternating sides** of the transversal. Referring to the diagram above do the following.

- (a) Name two pairs of alternate interior angles. (b) Name two pairs of same side interior angles.
- (c) Name two pairs of alternate exterior angles. (d) Name two pairs of same side exterior angles.



Alternate and same side angle pairs have important relationships, as we will explore in the next exercise. Remember, we take as fact that **corresponding angle pairs** and **vertical angle pairs** have equal measures.

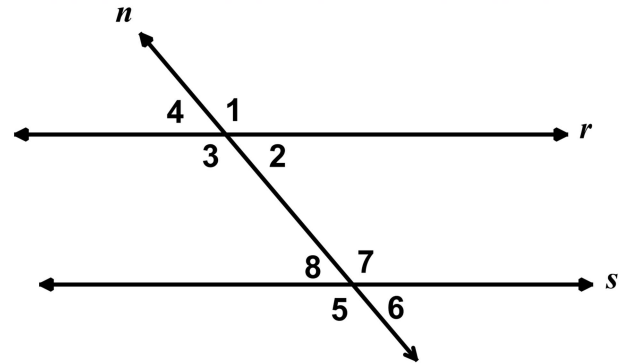
Exercise #4: In the diagram shown, parallel lines r and s are crossed by n . The measure of $\angle 1$ is 130° .

(a) What angle corresponds to $\angle 1$? Fill its measure in.

(b) Fill in all other measures using vertical angle pairs and supplementary angles.

(c) List the two pairs of **alternate interior angles** below along with their measures.

(d) List the two pairs of **same side interior angles** below along with their measures.

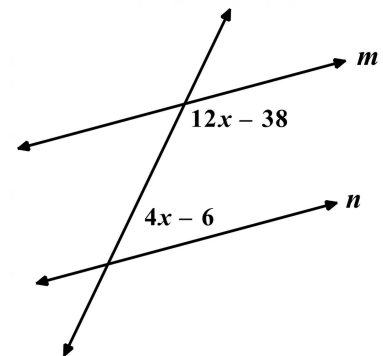


What is true about **the measures** of **alternate interior angle pairs**?

What is true about **the measures** of **same side interior angle pairs**?

Exercise #5: Do exterior angle pairs show the same pattern as interior angle pairs? Explain.

Exercise #6: In the diagram shown, m is parallel to n . Find the value of x algebraically. Show the work that leads to your answer.



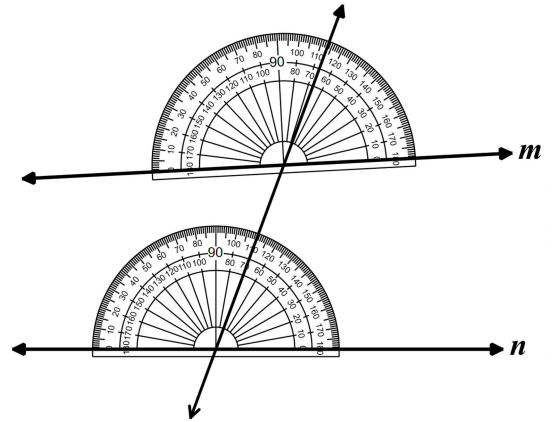
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MORE WORK WITH PARALLEL LINES N-GEN MATH[®] 8 HOMEWORK

FLUENCY

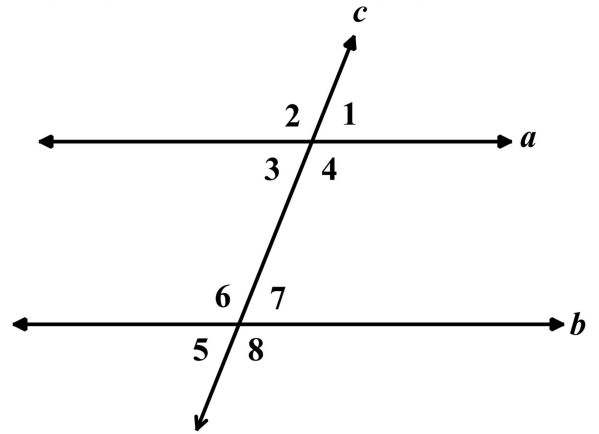
1. How can you use the protractor measurements in the diagram to conclude that line m is **not** parallel to line n ?



2. In the diagram shown, line a is parallel to line b , or $a \parallel b$. The measure of $\angle 1$ is 65° . Using this measure, fill in the measure of all other numbered angles on the diagram.

3. List the two pairs of alternate interior angles.

4. List the two pairs of same side interior angles.



5. List the two pairs of alternate exterior angles.

6. List the two pairs of same side exterior angles.

7. For each type of angle pair below, circle whether the angles are equal or supplementary (add up to 180°).

(a) alternate interior (b) same side interior (c) alternate exterior (d) same side exterior

equal

equal

equal

equal

supplementary

supplementary

supplementary

supplementary

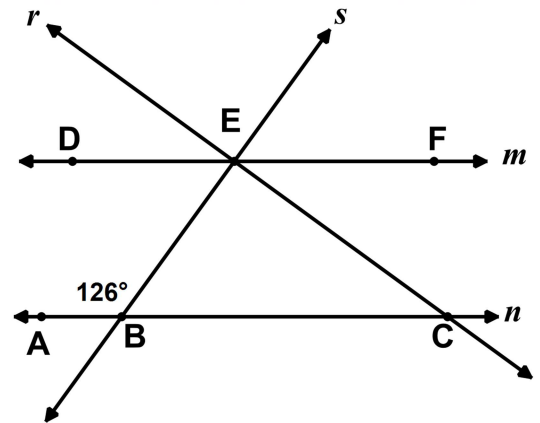


8. In the diagram shown, line m is parallel to line n . They are crossed by transversals r and s . Finally, r and s are perpendicular to each other. It is known that $m\angle ABE = 126^\circ$ as shown.

(a) What is the measure of $\angle DEB$? Justify.

(b) What is the measure of $\angle DEC$? Justify.

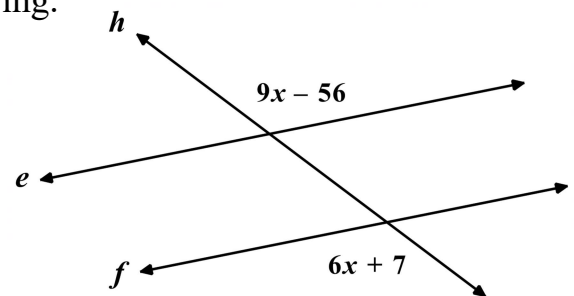
(c) What is the measure of $\angle BCE$? Justify.



9. Given parallel lines e and f shown below do the following.

(a) Two angles have algebraic expressions for their degree measures. What type of angle pair are these two?

(b) Find the value of x algebraically. Show your work.



REASONING

10. In the diagram at the right, lines m and n are crossed by t .

(a) How can you tell from the measures of the two given angles that m and n are **not** parallel?

(b) Since they are **not parallel**, they must intersect. Do they intersect to the right or left of the transversal? How can the measures of the angles tell you which side?

