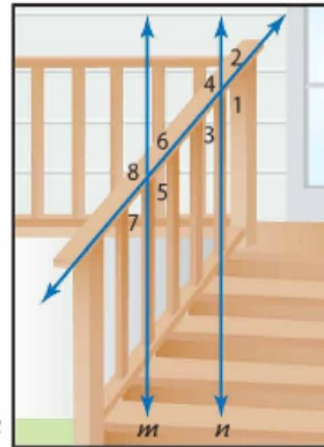
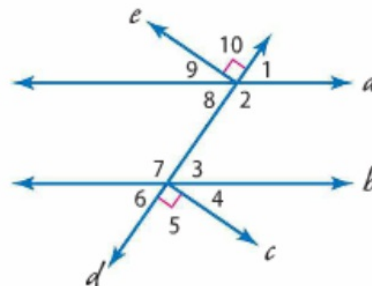


1. Refer to the porch stairs shown. Line m is parallel to line n and $m\angle 7$ is 35° . Find the measure of $\angle 1$. Justify your answer. (Example 3)


145°; Sample answer: $\angle 7$ and $\angle 5$ are supplementary. So, $m\angle 5 = 180^\circ - 35^\circ$ or 145° . $\angle 5$ and $\angle 1$ are corresponding angles. Since corresponding angles have the same measure, $m\angle 1 = 145^\circ$.



- Refer to the figure at the right. Line a is parallel to line b and $m\angle 2$ is 135° . Find each given angle measure. Justify your answer. (Examples 1, 2, and 4)



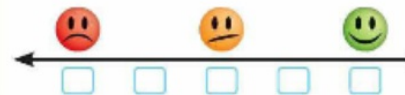
2. $m\angle 9$ **45°; Sample answer: $\angle 2$ and angles 9 and 10 are vertical angles. So, $m\angle 9 + m\angle 10 = 135^\circ$. So, $m\angle 9 = 135^\circ - 90^\circ$ or 45° .**
3. $m\angle 7$ **135°; Sample answer: $\angle 2$ and $\angle 7$ are alternate interior angles. So, $m\angle 7 = 135^\circ$.**

4.  **Building on the Essential Question** How are the measures of the angles related when parallel lines are cut by a transversal?

Sample answer: The angles are either equal or supplementary.

Rate Yourself!

How confident are you about lines and angles? Check the box that applies.



Independent Practice

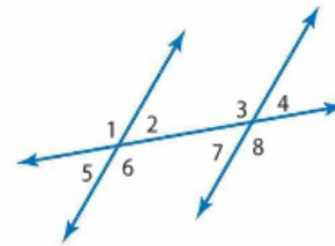
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Classify each pair of angles as *alternate interior*, *alternate exterior*, or *corresponding*. (Examples 1 and 2)

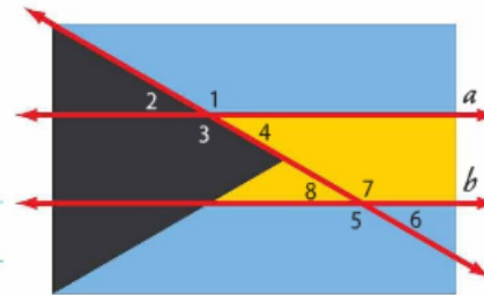
1. $\angle 2$ and $\angle 4$ **corresponding** _____

2. $\angle 4$ and $\angle 5$ **alternate exterior** _____

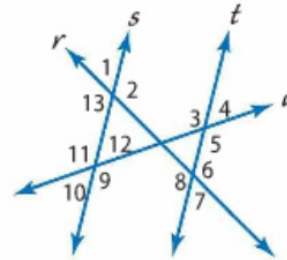


3 In the flag shown at the right, line a is parallel to line b . If $m\angle 1 = 150^\circ$, find $m\angle 4$ and $m\angle 7$. Justify your answers. (Example 3) **$m\angle 4 = 30^\circ$, $m\angle 7 = 150^\circ$;**

Sample answer: $\angle 1$ and $\angle 7$ are corresponding angles so their measures are equal. $\angle 1$ and $\angle 4$ are supplementary. So, $m\angle 4 = 180^\circ - 150^\circ$ or 30° .

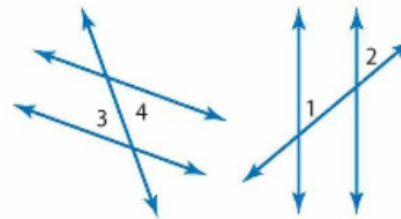


Refer to the figure at the right. Line s is parallel to line t , $m\angle 2$ is 110° and $m\angle 11$ is 137° . Find each given angle measure. Justify your answer. (Example 4)

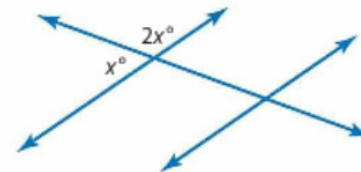


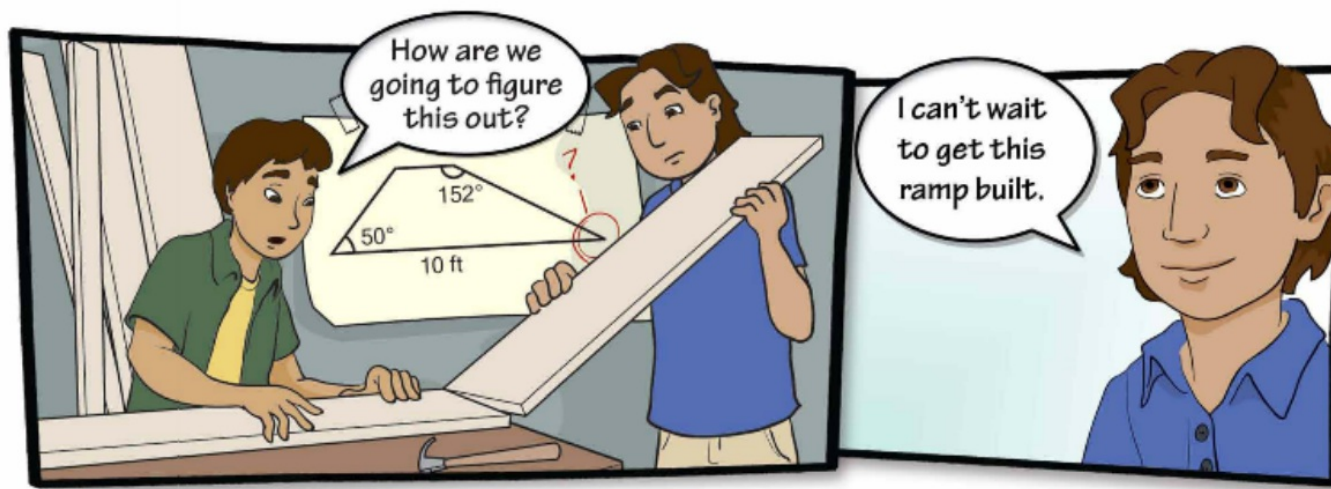
4. $m\angle 7$ 70° ; Sample answer: $\angle 2$ and $\angle 6$ are corresponding angles, so they have the same measure. $\angle 6$ and $\angle 7$ are supplementary. So, $m\angle 7 = 180 - 110$ or 70° .
5. $m\angle 8$ 110° ; Sample answer: $\angle 2$ and $\angle 8$ are alternate interior angles, so they have the same measure.
6. $m\angle 3$ 137° ; Sample answer: $\angle 11$ and $\angle 3$ are corresponding angles, so they have the same measure.

7. The parallel lines at the right are cut by a transversal. Find the value of x .
- a. Angles 1 and 2 are corresponding angles, $m\angle 1 = 45^\circ$, and $m\angle 2 = (x + 25)^\circ$. 20
- b. Angles 3 and 4 are alternate interior angles, $m\angle 3 = 2x^\circ$, and $m\angle 4 = 80^\circ$. 40



8. Describe a method you could use to find the value of x in the figure at the right without using a protractor. Sample answer: The two angles are supplementary. So, $x + 2x = 180^\circ$; $x = 60$.

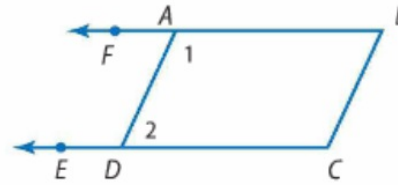




- a. Describe a method you could use to find the missing angle. **The top and bottom of the ramp are parallel. The slanted part of the ramp can be considered a transversal. You can use angle relationships of parallel lines to find the measure of the missing angle.**
- b. Use your method from part a to find the measure of the missing angle.

28°

10. **CCSS Persevere with Problems** Quadrilateral $ABCD$ is a parallelogram. Make a conjecture about the relationship of $\angle 1$ and $\angle 2$. Justify your reasoning. $\angle 1$ and $\angle 2$ are supplementary. Sample answer: Since \overleftrightarrow{AB} and \overleftrightarrow{DC} are parallel, $m\angle 1 = m\angle ADE$ (alternate interior angles have the same measure). Since $\angle ADE$ and $\angle 2$ lie on the same line, they are supplementary, and $m\angle ADE + m\angle 2 = 180^\circ$. Substitute $\angle 1$ for $\angle ADE$. Therefore, $m\angle 1 + m\angle 2 = 180^\circ$.



11. **CCSS Reason Inductively** If two parallel lines are cut by a transversal, what relationship exists between interior angles that are on the same side of the transversal? They are supplementary.

12. **CCSS Reason Inductively** Suppose $m\angle 1 = x^\circ$. Use an informal argument to write an expression for the measure of $\angle 6$ in the diagram at the right. Sample answer: $\angle 1$ and $\angle 2$ are supplementary, so $m\angle 2 = 180^\circ - x^\circ$. $\angle 2$ and $\angle 6$ are corresponding angles. So, $m\angle 6 = 180^\circ - x^\circ$.

