

Lesson 7: Solve for Unknown Angles—Transversals

Classwork

Opening Exercise

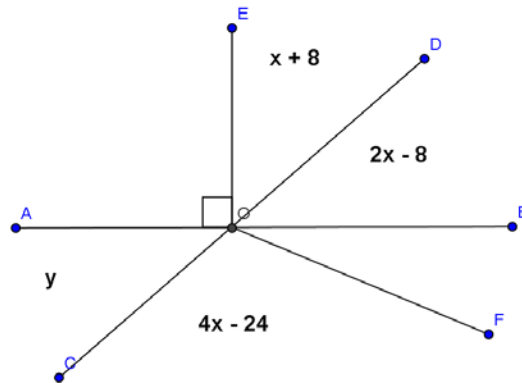
Use the diagram at the right to determine x and y .
 \overleftrightarrow{AB} and \overleftrightarrow{CD} are straight lines.

$x =$ _____

$y =$ _____

Name a pair of vertical angles:

Find the measure of $\angle BOF$. Justify your calculation.



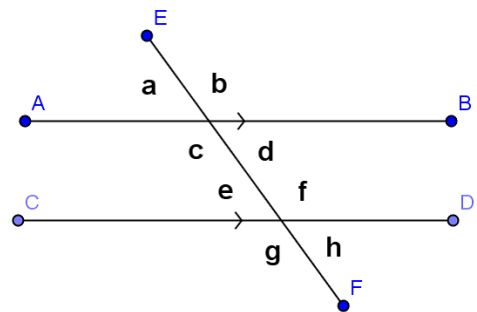
Discussion

Given line AB and line CD in a plane (see the diagram below), a third line EF is called a *transversal* if it intersects \overleftrightarrow{AB} at a single point and intersects \overleftrightarrow{CD} at a single but different point. Line AB and line CD are parallel if and only if the following types of angle pairs are congruent or supplementary.

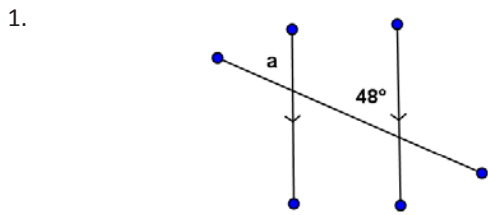
- Corresponding angles are equal in measure

- Alternate interior angles are equal in measure

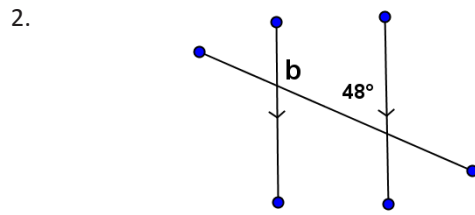
- Same side interior angles are supplementary



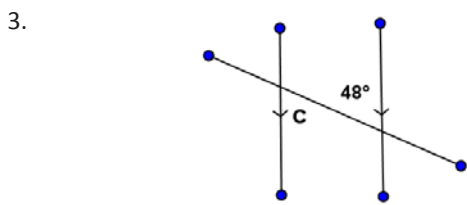
Examples



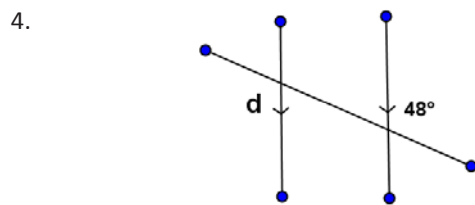
$m\angle a = \underline{\hspace{2cm}}$



$m\angle b = \underline{\hspace{2cm}}$



$m\angle c = \underline{\hspace{2cm}}$

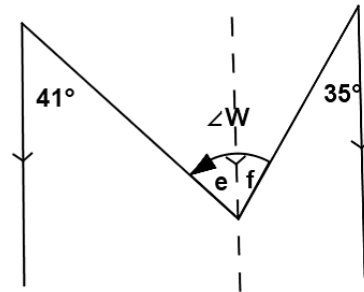


$m\angle d = \underline{\hspace{2cm}}$

5. An _____ is sometimes useful when solving for unknown angles.

In this figure, we can use the auxiliary line to find the measures of $\angle e$ and $\angle f$ (how?), then add the two measures together to find the measure of $\angle W$.

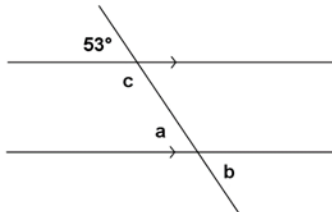
What is the measure of $\angle W$?



Exercises

In each exercise below, find the unknown (labeled) angles. Give reasons for your solutions.

1.

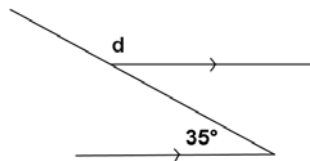


$m\angle a =$ _____

$m\angle b =$ _____

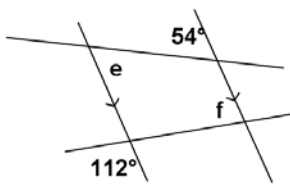
$m\angle c =$ _____

2.



$m\angle d =$ _____

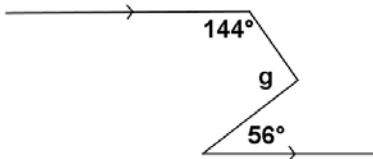
3.



$m\angle e =$ _____

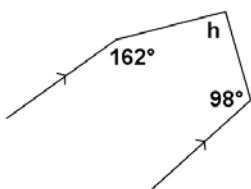
$m\angle f =$ _____

4.



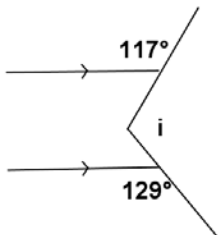
$m\angle g =$ _____

5.



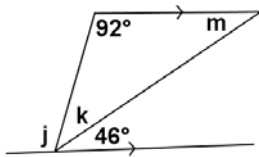
$m\angle h =$ _____

6.



$m\angle i =$ _____

7.

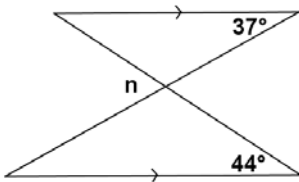


$m\angle j =$ _____

$m\angle k =$ _____

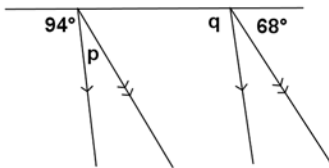
$m\angle m =$ _____

8.



$m\angle n =$ _____

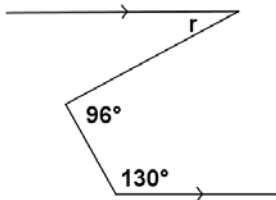
9.



$m\angle p =$ _____

$m\angle q =$ _____

10.



$m\angle r =$ _____

Relevant Vocabulary

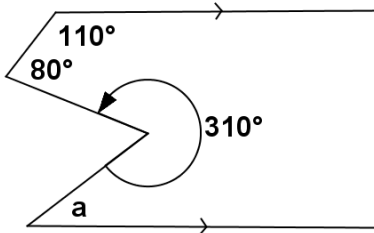
Alternate Interior Angles: Let line t be a transversal to lines l and m such that t intersects l at point P and intersects m at point Q . Let R be a point on line l and S be a point on line m such that the points R and S lie in opposite half-planes of t . Then $\angle RPQ$ and $\angle PQS$ are called *alternate interior angles* of the transversal t with respect to line m and line l .

Corresponding Angles: Let line t be a transversal to lines l and m . If $\angle x$ and $\angle y$ are alternate interior angles, and $\angle y$ and $\angle z$ are vertical angles, then $\angle x$ and $\angle z$ are *corresponding angles*.

Problem Set

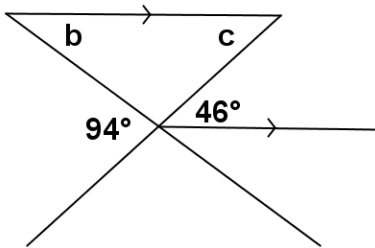
Find the unknown (labeled) angles. Give reasons for your solutions.

1.



$m\angle a =$ _____

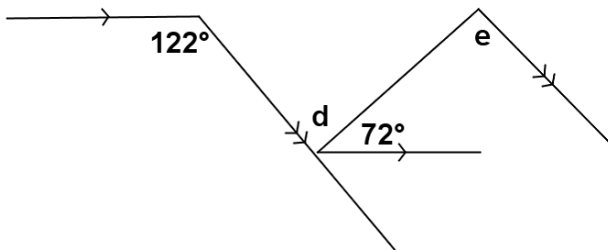
2.



$m\angle b =$ _____

$m\angle c =$ _____

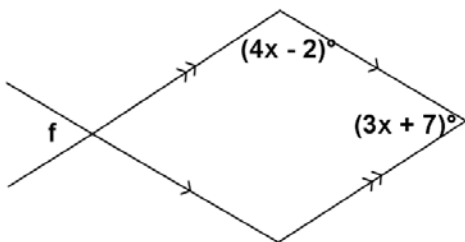
3.



$m\angle d =$ _____

$m\angle e =$ _____

4.



$m\angle f =$ _____