

Lesson 7: Solve for Unknown Angles—Transversals

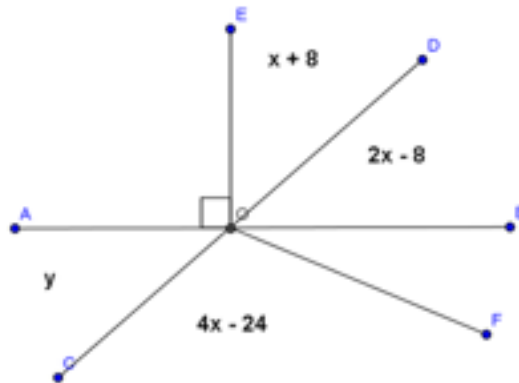
Classwork

Opening Exercise

Use the diagram at the right to determine $\angle A$, $\angle C$, and $\angle F$ if \overline{AE} and \overline{CF} are straight lines.

Name a pair of vertical angles:

Find the measure of $\angle C$. Justify your calculation. _____



Discussion

Given line ℓ and line m in a plane (see the diagram below), a third line t is called a *transversal* if it intersects ℓ at a single point and intersects m at a single but different point. Line ℓ and line m are parallel if and only if the following types of angle pairs are congruent or supplementary.

- Corresponding angles are equal in measure

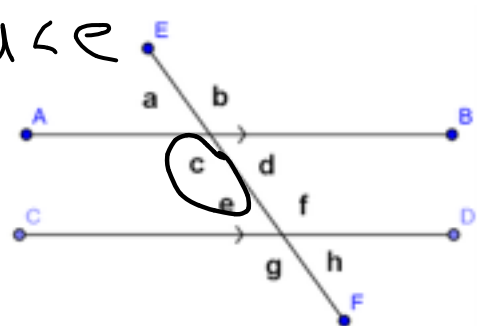
$\angle b$ and $\angle f$, $\angle a$ and $\angle e$
 $\angle d$ and $\angle h$, $\angle c$ and $\angle g$

- Alternate interior angles are equal in measure

$\angle c$ and $\angle f$, $\angle d$ and $\angle e$

- Same side interior angles are supplementary

$\angle c$ and $\angle e$, $\angle d$ and $\angle f$



Examples

Corresponding

= _____

= _____

= _____

= _____

e
re
naly

5. An Auxiliary line 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 $\angle W$.

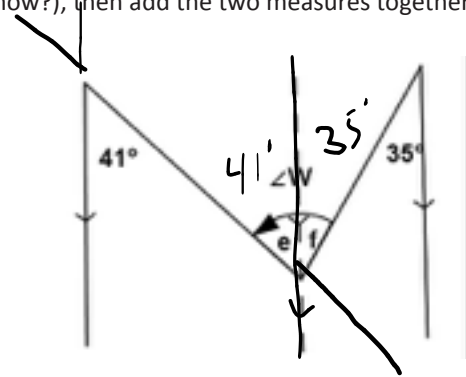
What is the measure of $\angle W$?

Alternate Interior Angles

$$m\angle W = m\angle e + m\angle f$$

$$= 41^\circ + 35^\circ$$

$$m\angle W = 76^\circ$$



al
s

Exercises

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

= _____

= _____

= _____

= _____

= _____

= _____


= _____

= _____

= _____

9

$$\begin{array}{r} 180 \\ - 11 \\ \hline 169 \\ - 146 \\ \hline 23 \end{array}$$


 = _____ 2° Alt.
 = _____
 = _____

 = _____

 = _____

 = _____

 = _____

Relevant Vocabulary

Alternate Interior Angles: Let line be a transversal to lines and such that intersects at point and intersects at point . Let be a point on line and be a point on line such that the points and lie in opposite half-planes of . Then and are called *alternate interior angles* of the transversal with respect to line and line .

Corresponding Angles: Let line be a transversal to lines and . If and are alternate interior angles, and and are vertical angles, then and are *corresponding angles*.

Problem Set

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

_____ = 40°

_____ r

_____ und

= _____

= _____

= _____

= _____

= _____