# 4.1 Angles Formed by Intersecting Lines
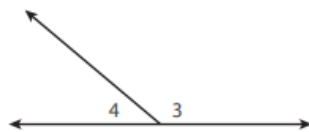
Essential Question: How can you find the measures of angles formed by intersecting lines?

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## Linear Pair Theorem

A linear pair is a pair of adjacent angles whose noncommon sides are opposite rays.

**The Linear Pair Theorem**

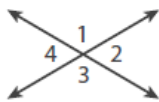If two angles form a linear pair, then they are supplementary.

$m\angle 3 + m\angle 4 = 180°$

Vertical Angles- the angles that are opposite each other when two lines intersect

**The Vertical Angles Theorem**

If two angles are vertical angles, then the angles are congruent.



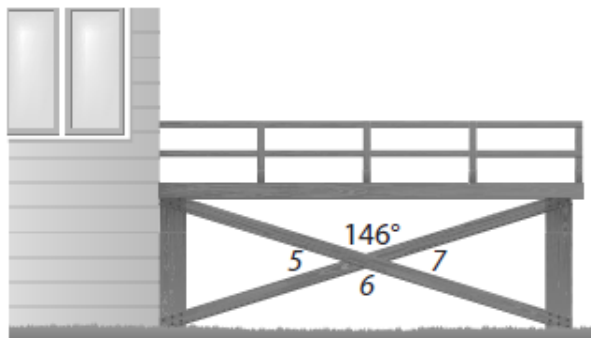$\angle 1 \cong \angle 3$ and $\angle 2 \cong \angle 4$

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**Example 1** Cross braces help keep the deck posts straight. Find the measure of each angle.

Find $\angle 6$

$146°$

$\angle 5$ and $\angle 7$

$180 - 146 = 34°$

6. The measures of two vertical angles are 58° and $(3x + 4)°$. Find the value of $x$.

$$58 = 3x+4$$
$$-4 \qquad -4$$
$$\overline{54 = 3x}$$

$$x = 18$$

7. The measures of two vertical angles are given by the expressions $(x + 3)°$ and $(2x − 7)°$. Find the value of $x$. What is the measure of each angle?

$13°$     $13°$
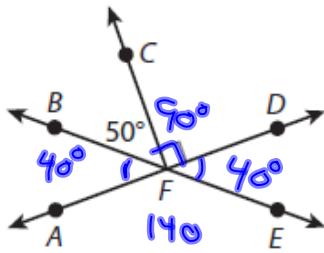
$$x+3=2x-7$$
$$-x+7 \quad -x+7$$
$$\overline{10=x}$$

Complementary Angles- two angles whose measures have a sum of 90 degrees

Supplementary Angles- two angles whose measures have a sum of 180 degrees

**Example 2**  Use the diagram below to find the missing angle measures. Explain your reasoning.

B  50°  60°  D
C
40°  (  )  40°
F
A  140  E

Find the measures of ∠AFC and ∠AFB.     Find the measures of ∠DFE and ∠AFE.