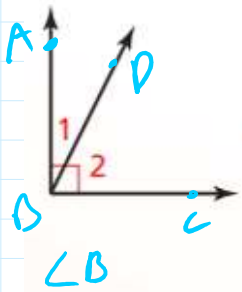
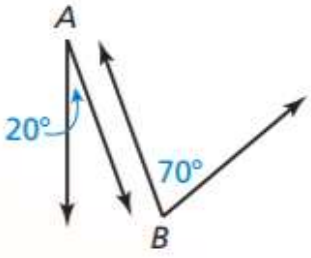
What You Will Learn

- Identify complementary and supplementary angles.
- Identify linear pairs and vertical angles.

Complementary and Supplementary Angles



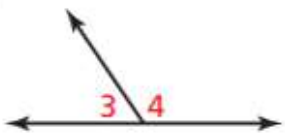
∠1 and ∠2



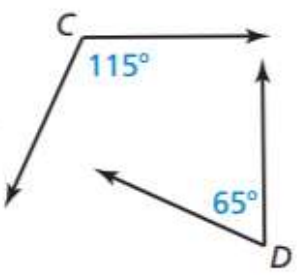
∠A and ∠B

complementary angles

Two positive angles whose measures have a sum of 90°. Each angle is the *complement* of the other.



∠3 and ∠4



∠C and ∠D

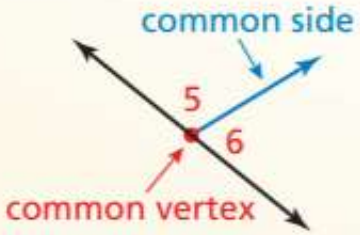
supplementary angles

Two positive angles whose measures have a sum of 180°. Each angle is the *supplement* of the other.

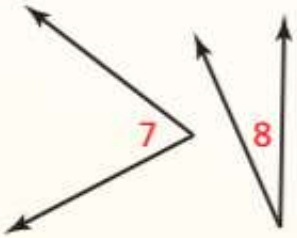
complementary
one
Supplementary
straight line

Adjacent Angles

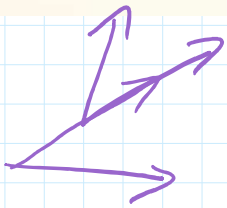
Complementary angles and supplementary angles can be *adjacent angles* or *nonadjacent angles*. **Adjacent angles** are two angles that share a common vertex and side, but have no common interior points.



∠5 and ∠6 are adjacent angles.



∠7 and ∠8 are nonadjacent angles.



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a. ∠5 is a complement of ∠3, and $m\angle 3 = 53°$. Find $m\angle 5$. $= 37°$

$90 = 53 + x$

$-53 \quad -53$

$37 = x$

b. ∠4 is a supplement of ∠2, and $m\angle 4 = 29°$. Find $m\angle 2$.

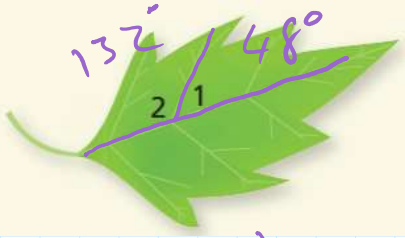
151°

$180 = 29 + x$

$-29 \quad -29$

$151 = x$

The veins in a leaf form a pair of supplementary angles. Find the measures of the angles when $m\angle 1 = (7x + 13)°$ and $m\angle 2 = (25x + 7)°$.



$180 = (7x + 13) + (25x + 7)$

$180 = 32x + 20$

$-20 \quad -20$

$\frac{160}{32} = \frac{32x}{32}$

$5 = x$

$7x + 13 ; x = 5$

$7 \cdot 5 + 13$

$35 + 13$

48

$25x + 7 ; x = 5$

$25 \cdot 5 + 7$

$125 + 7$

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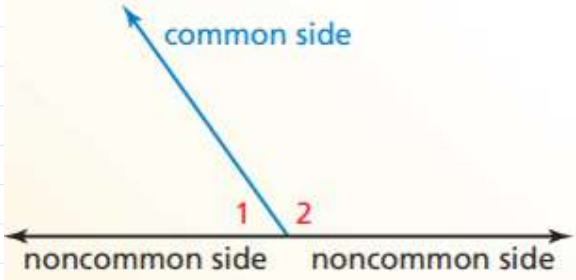
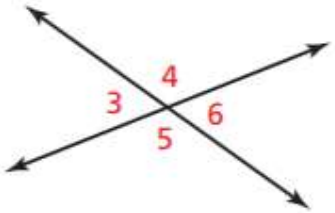
Linear Pairs and Vertical Angles

Two adjacent angles are a **linear pair** when their noncommon sides are opposite rays. The angles in a linear pair are supplementary angles.

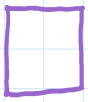


∠1 and ∠2 are a linear pair.

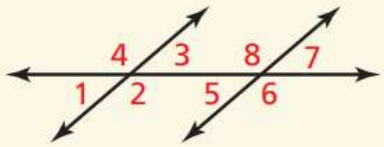
Two angles are **vertical angles** when their sides form two pairs of opposite rays.



∠3 and ∠6 are vertical angles.
∠4 and ∠5 are vertical angles.



Identify all of the linear pairs and all of the vertical angles in the figure.



Linear pairs
∠4, ∠3
∠3, ∠2
∠2, ∠1
∠1, ∠4
∠8, ∠7
∠7, ∠6
∠6, ∠5
∠5, ∠8

Vertical angles
∠4, ∠2
∠1, ∠3
∠8, ∠6
∠5, ∠7

Two angles form a linear pair. The measure of one angle is eight times the measure of the other angle. Find the measure of each angle.

$180 = \angle 1 + \angle 2$

$180 = x + 8x$

$\frac{180}{9} = \frac{9x}{9}$

$20 = x$

20°, 160°

Practice sec 1.6 **pg. 52: 3-7A, 9-21EO**