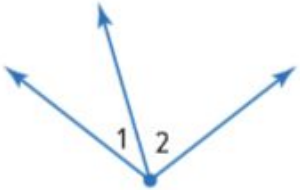
Angle Relationships

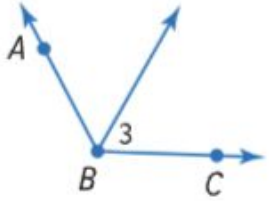
By Ms. Gabbie Dayrit

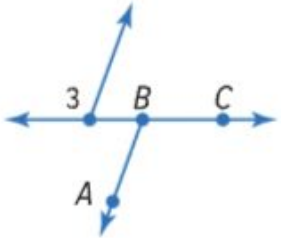
Adjacent angles are two angles that lie in the same plane and have a common vertex and a common side, but no common interior points.

Examples $\angle 1$ and $\angle 2$ are adjacent angles.



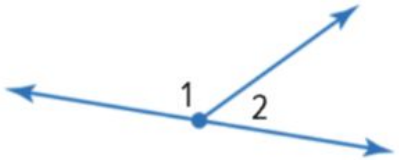
Nonexamples $\angle 3$ and $\angle ABC$ are nonadjacent angles



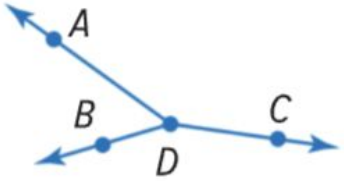


A **linear pair** is a pair of adjacent angles with noncommon sides that are opposite rays.

Example $\angle 1$ and $\angle 2$



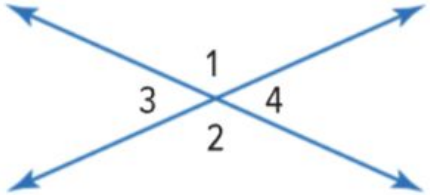
Nonexample $\angle ADB$ and $\angle ADC$



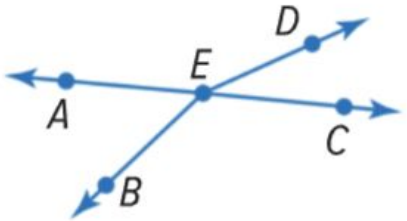
Think of it as two angles making up a horizontal line!

Vertical angles are two nonadjacent angles formed by two intersecting lines.

Examples $\angle 1$ and $\angle 2$; $\angle 3$ and $\angle 4$



Nonexample $\angle AEB$ and $\angle DEC$



When two lines intersect, the opposite angles are known as vertical angles! Vertical angles are congruent!

CONGRUENT

When figures are identical in form

CONGRUENT

figures are the same

vs.

EQUAL

numbers are the same

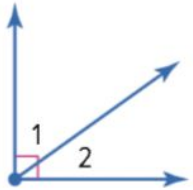
two figures are

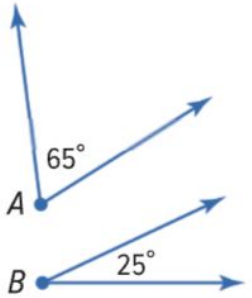
CONGRUENT

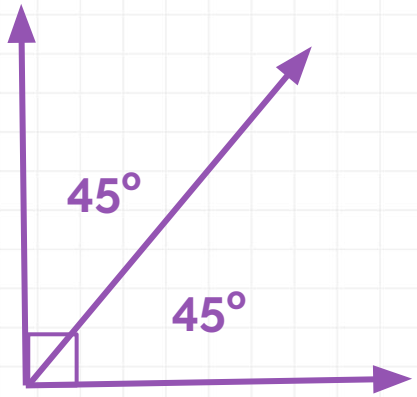
if their measurements are equal!

Complementary angles are two angles with measures that have a sum of 90.

Examples $\angle 1$ and $\angle 2$ are complementary.
$\angle A$ is complementary to $\angle B$.

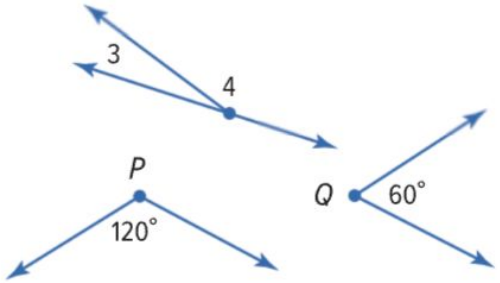


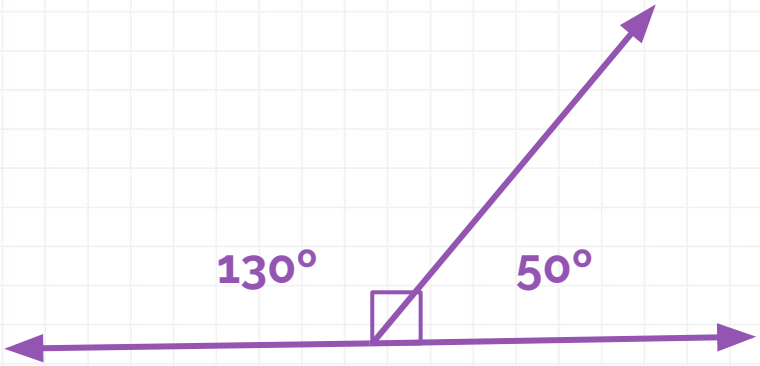




Supplementary angles are two angles with measures that have a sum of 180.

Examples $\angle 3$ and $\angle 4$ are supplementary.
$\angle P$ and $\angle Q$ are supplementary.





sup!

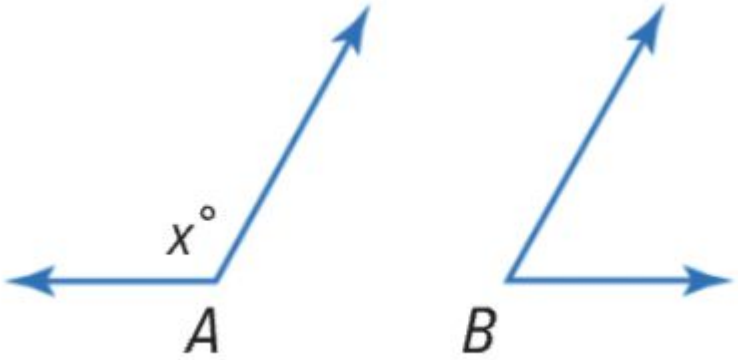
180

you look good today!

90

Sup, time to solve!

ALGEBRA Find the measures of two supplementary angles if the difference in the measures of the two angles is 18.

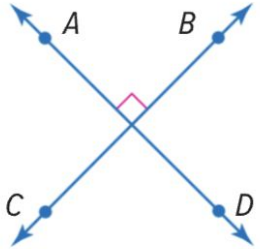


2 Perpendicular Lines

Lines, segments, or rays that form right angles are **perpendicular.**

Key Concept Perpendicular Lines

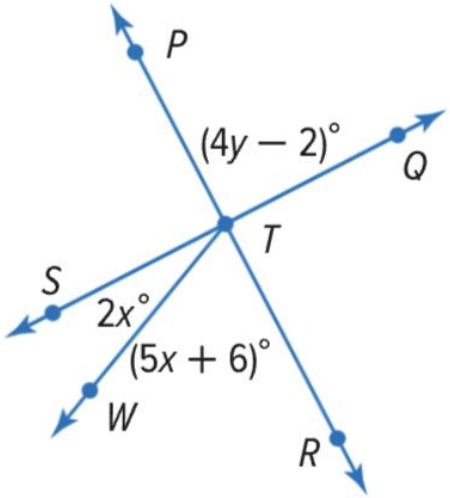
- Perpendicular lines intersect to form four right angles.
- Perpendicular lines intersect to form congruent adjacent angles.
- Segments and rays can be perpendicular to lines or other line segments and rays.
- The right angle symbol in the figure indicates that the lines are perpendicular.



Symbol $\perp$ **is read** *is perpendicular to.* **Example** $\overleftrightarrow{AD} \perp \overleftrightarrow{CB}$

ALGEBRA Find x and y so that $\overleftrightarrow{PR}$ and $\overleftrightarrow{SQ}$ are perpendicular.

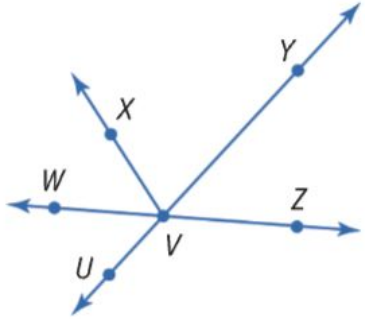
If $\overleftrightarrow{PR} \perp \overleftrightarrow{SQ}$, then $m\angle STR = 90$ and $m\angle PTQ = 90$.



Check your understanding!

Example 1 **Name an angle pair that satisfies each condition.**

1. two acute vertical angles
2. two obtuse adjacent angles



Check your understanding!

4. **ALGEBRA** The measures of two complementary angles are $7x + 17$ and $3x - 20$. Find the measures of the angles.

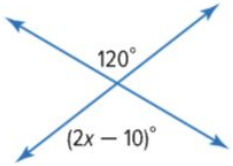
5. **ALGEBRA** Lines x and y intersect to form adjacent angles 2 and 3. If $m\angle 2 = 3a - 27$ and $m\angle 3 = 2b + 14$, find the values of a and b so that x is perpendicular to y.

Check your understanding!

S

Example 2 **Find the value of each variable.**

19.



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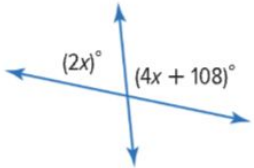

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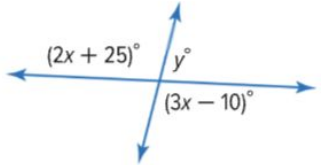

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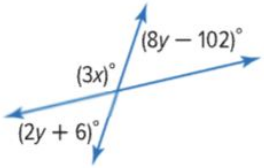

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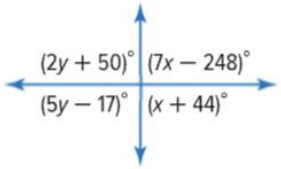

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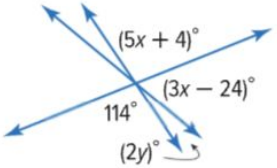


Check your understanding!

25. **ALGEBRA** $\angle E$ and $\angle F$ are supplementary. The measure of $\angle E$ is 54 more than the measure of $\angle F$. Find the measures of each angle.

26. **ALGEBRA** The measure of an angle's supplement is 76 less than the measure of the angle. Find the measure of the angle and its supplement.

Critical thinking!

Example 4 **Determine whether each statement can be assumed from the figure. Explain.**

36. $\angle 4$ and $\angle 7$ are vertical angles.

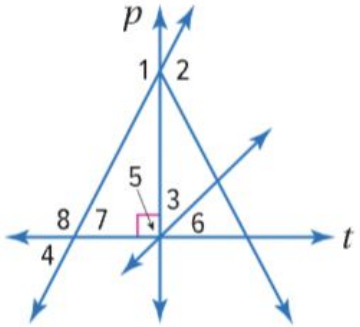
37. $\angle 4$ and $\angle 8$ are supplementary.

38. $p \perp t$

39. $\angle 3 \cong \angle 6$

40. $\angle 5 \cong \angle 3 + \angle 6$

41. $\angle 5$ and $\angle 7$ form a linear pair.



BLOOKET!

HOMEWORK

PAGE 52 - 27 to 32, 34 to 35

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