

## Angle Theorems

Complementary, Supplementary, and more!

Homework: pg 152-153 (4,5,10,12,14)

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## Today You'll Learn

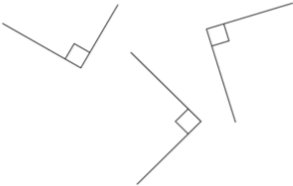
Theorems about Complementary, Supplementary Angles

- Linear Pairs
- Vertical Angles
- Congruent, Adjacent Angles

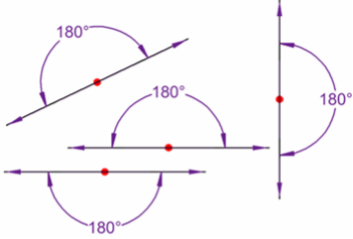
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## Right & Straight Angles

All right angles are congruent




All straight angles are congruent



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## Adjacent Angles

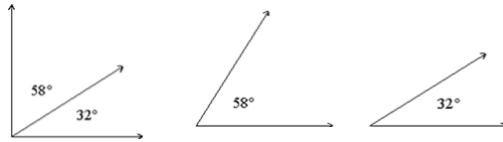
- **Adjacent angles** are two angles that share a common vertex and a common side but do not have any interior points in common.



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### Complements



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### Complements

Two complementary angles measure  $x$  and  $65^\circ$ . How many degrees are there in  $x$  ?

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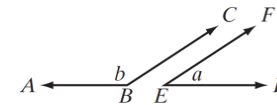
### Complements

Find the measure of an angle if its measure is 24 degrees more than the measure of its complement.

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### Supplements

- Angle ABC is the *supplement* of angle DEF.



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Same angle:

- If two angles are complements of the same angle, they're congruent.
- If two angles are supplements of the same angle, they're congruent.

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Given  $\angle 1$  is the complement of  $\angle 2$  and  $\angle 3$  is the complement of  $\angle 2$ .

Prove  $\angle 1 \cong \angle 3$

$\angle 1$  is the complement of  $\angle 2$   
 $\angle 3$  is the complement of  $\angle 2$

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- If two angles are congruent then their **complements** are congruent.
- If two angles are congruent, then their **supplements** are congruent.

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Given  $\angle ABD \cong \angle EFH$   
 $\angle CBD$  is the complement of  $\angle ABD$ .  
 $\angle GFH$  is the complement of  $\angle EFH$ .

Prove  $\angle CBD \cong \angle GFH$

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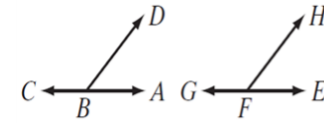
*Is this true?*

- If two angles are complementary to congruent angles, then they are congruent.
- If two angles are supplementary to congruent angles, then they are congruent.

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**Given**  $\angle ABD \cong \angle EFH$ ,  $\angle CBD$  is the supplement of  $\angle ABD$ , and  $\angle GFH$  is the supplement of  $\angle EFH$ .

**Prove**  $\angle CBD \cong \angle GFH$



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### Linear Pairs

Definition:

Linear Pair- two adjacent angles whose sum is a straight line.

Theorem:

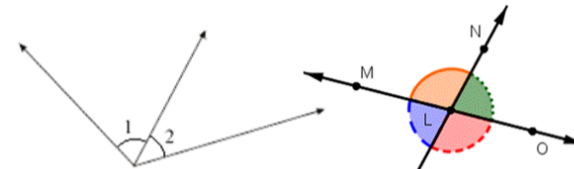
If two angles form a linear pair, they are supplementary.



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### Congruent, Adjacent angles

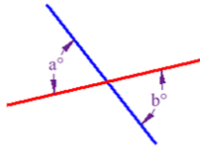
- Congruent Adjacent Angles: If two **lines intersect** to form congruent, adjacent angles, then they are perpendicular.



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### Vertical Angles

Theorem:  
If two lines intersect the vertical angles are congruent.



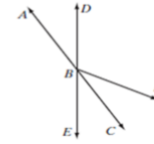
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#### EXAMPLE 2

If  $\overrightarrow{ABC}$  and  $\overrightarrow{DBE}$  intersect at  $B$  and  $\overrightarrow{BC}$  bisects  $\angle EBF$ , prove that  $\angle CBF \cong \angle ABD$ .

**Solution** Given:  $\overrightarrow{ABC}$  and  $\overrightarrow{DBE}$  intersect at  $B$  and  $\overrightarrow{BC}$  bisects  $\angle EBF$ .

Prove:  $\angle CBF \cong \angle ABD$



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