Lesson 2.1 Angles and Congruence

Tuesday, September 12, 2023 9:56 PM

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Lesson 2.1 Angles

Lesson 2.1 Angles and Congruence
Workbook pages 61-70

Content Objective

Students identify and use angles, angle parts, and special angle pairs.

Florida's B.E.S.T. Standards for Mathematics

MA.912.GR.1.6

Solve mathematical and real-world problems involving congruence or similarity in two-dimensional figures.

MA.912.GR.5.1

Construct a copy of a segment or an angle.

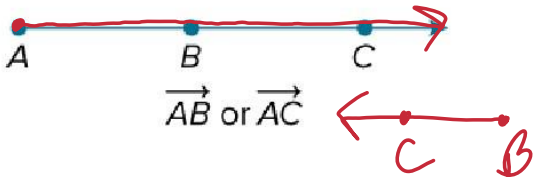
MA.912.GR.5.2

Construct the bisector of a segment or an angle, including the perpendicular bisector of a line segment.

Learn
Angles

Lines and portions of lines intersect to form angles.

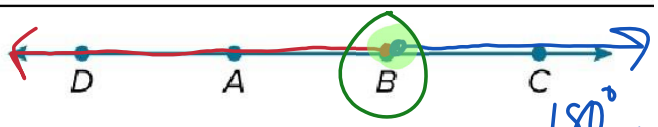
A **ray** is the part of a line consisting of a point on the line, called the *endpoint of the ray*, together with all of the collinear points on one side of the endpoint.



Rays are named by stating the endpoint first and then another point on the ray.

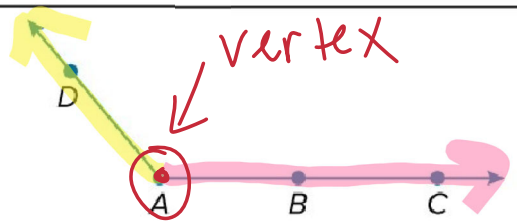
Learn
Angles

Two collinear rays with a common endpoint are **opposite rays**. Opposite rays form a **straight angle**, which has a measure of 180°.



$\overrightarrow{BA}$ and $\overrightarrow{BC}$ are opposite rays.

An **angle** is a pair of rays that have a common endpoint.



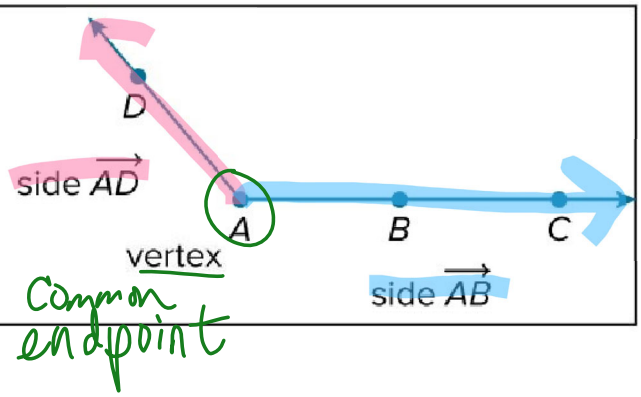
∠A, ∠DAB, ∠DAC, ∠CAD, ∠BAD

Learn
Angles

The rays are called **sides** of the angle. The common endpoint is the **vertex**.

$\angle DAB$ $\angle CAD$
$\angle BAD$

vertex always middle letter



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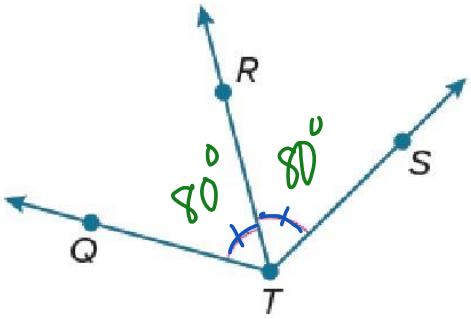
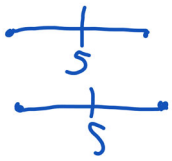
Learn
Congruent Angles

The measure of an angle is the measure in degrees of the space between the sides of the angle. Angles that have the same measure are **congruent angles**. Congruent angles are indicated on the figure by a matching number of arcs.



$\angle QTR \cong \angle STR$

cong. seg.



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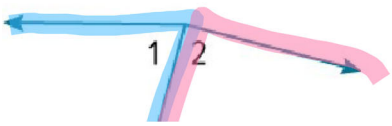
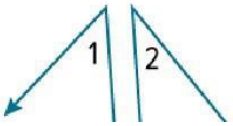
Learn
Special Angle Pairs

Special Angle Pairs		
Special Angle Pair Definition	**Examples**	**Nonexamples**
Adjacent angles are two angles that lie in the same plane, have a		

next to
connected

common vertex and a common side, but have no common interior points.	∠1 and ∠2 are adjacent angles.	

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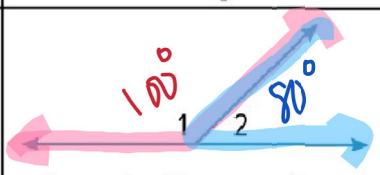
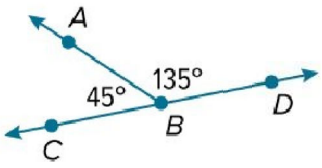
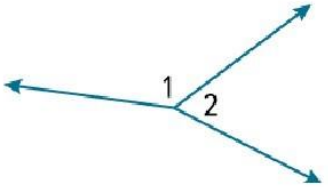
Learn
Special Angle Pairs

Special Angle Pairs		
Special Angle Pair Definition	**Examples**	**Nonexamples**
A **linear pair** is a pair of adjacent angles with noncommon sides that are opposite rays. The sum of the angle measures is 180°.	 ∠1 and ∠2 are a linear pair. 	

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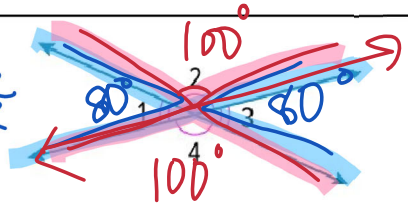
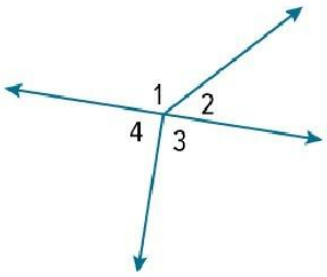
Learn
Special Angle Pairs

Special Angle Pairs		
Special Angle Pair Definition	**Examples**	**Nonexamples**
Vertical angles are the two nonadjacent angles formed by two intersecting lines. Vertical angles are congruent.	 ∠1 and ∠3 are vertical angles. ∠2 and ∠4 are vertical angles.	

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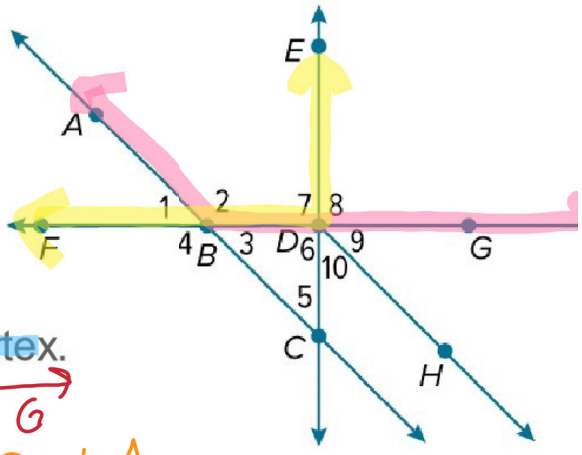
Example 1
Identify Angles



Use the figure to identify the angles or parts of angles that satisfy each given condition.

∠GDC
∠GDH

a. Name two angles that have *D* as a vertex.

b. Name the sides of ∠2. $\overrightarrow{BA}$ and $\overrightarrow{BG}$

c. Name a point in the interior of ∠*FDE*. Point A

d. Name all of the points in the exterior of ∠*FDE*. Point C

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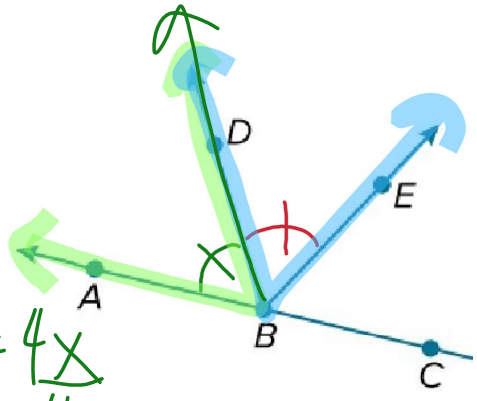
Example 2
Congruent Angles and Angle Bisectors



In the figure, $\overrightarrow{BA}$ and $\overrightarrow{BC}$ are opposite rays and $\overrightarrow{BD}$ bisects ∠*ABE*. If *m*∠*ABD* = (4*x* + 14)° and *m*∠*DBE* = (8*x* − 32)°, find *m*∠*DBE*.

$8(11.5)-32$

$4x+14=8x-32$
$-4x \quad -4x$
$14=4x-32$
$+32 \quad +32$

$\frac{46}{4}=\frac{4x}{4}$

$x=11.5$

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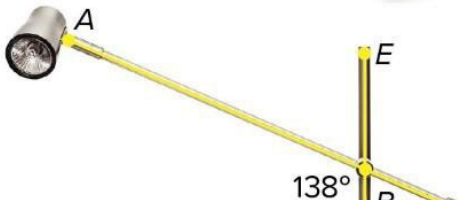
Example 3
Vertical Angles and Angle Pairs



HOME DECOR The office lamp is made using two intersecting metal bars.

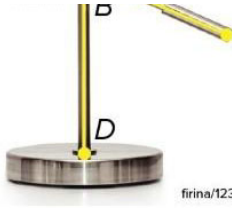
a. How many pairs of adjacent angles do you see in the figure? List two pairs.

b. Identify two pairs of vertical angles in the figure.

c. How many linear pairs do you see in the figure? List each pair.

d. Find $m\angle EBC$.

e. Find $m\angle ABE$.



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Example 3

Vertical Angles and Angle Pairs

Check

PARK A city planner is designing a park. He wants to place two pathways that intersect near the center of the park. If $m\angle GED = 88°$, identify the true statement(s).

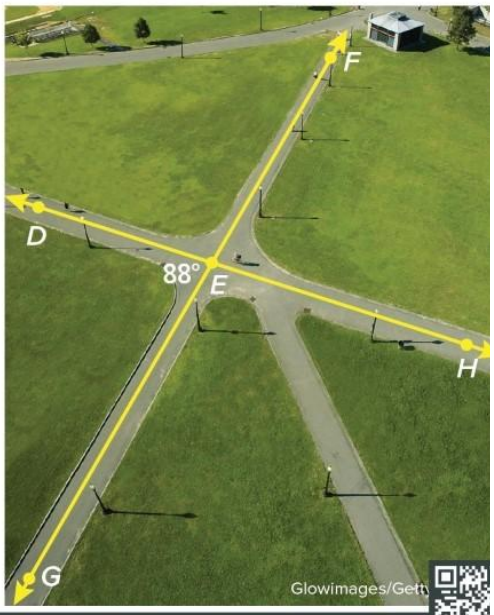
A. $m\angle DEF = 92°$

B. $m\angle DEG = 92°$

C. $m\angle FEH = 88°$

D. $m\angle DEH = 92°$

E. $m\angle GEH = 88°$



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