

## Lesson 2.2 Angle Relationships

Wednesday, September 20, 2023 9:07 PM

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Lesson 2.2  
Angle



# Lesson 2.2 Angle Relationships

## Workbook pages 71-80

### MA.912.GR.1.1

Prove relationships and theorems about lines and angles. Solve mathematical and real-world problems involving postulates, relationships and theorems of lines and angles.

### Content Objective

Students use the properties of perpendicular lines to find the measures of angles.



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### Learn

#### Complementary and Supplementary Angles



#### Complementary and Supplementary Angles

90

180

#### Complementary Angles

#### Supplementary Angles

#### Definition

two angles with measures that have a sum of  $90^\circ$

two angles with measures that have a sum of  $180^\circ$



70

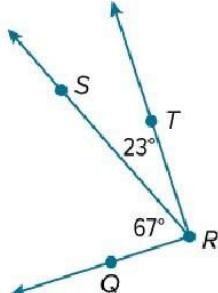
180



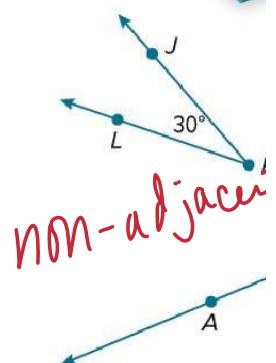
Students, draw anywhere on this slide!

Pear Deck Interactive Slide  
Do not remove this bar**Learn****Complementary and Supplementary Angles**

*adjacent*  
next  
to  
(share  
ray  $\overrightarrow{RQ}$ )

**Examples of Complementary Angles**

$$m\angle QRS + m\angle SRT = 67 + 23 = \textcircled{90}$$



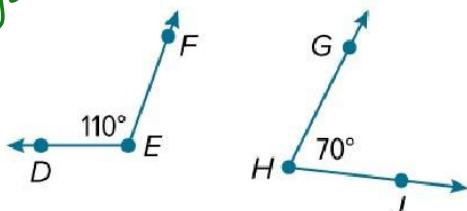
$$m\angle JKL + m\angle ABC = 30 + 60 = \textcircled{90}$$



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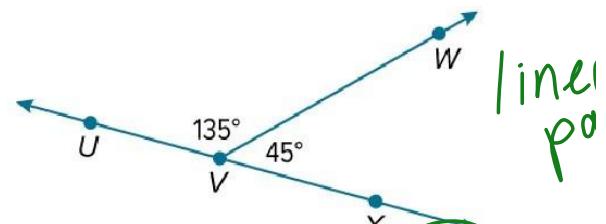
Pear Deck Interactive Slide  
Do not remove this bar**Learn****Complementary and Supplementary Angles**

*non-adjacent*

**Examples of Supplementary Angles**

$$m\angle DEF + m\angle GHJ = 110 + 70 = \textcircled{180}$$

*Adjacent*



$$m\angle UVW + m\angle WVX = 135 + 45 = \textcircled{180}$$

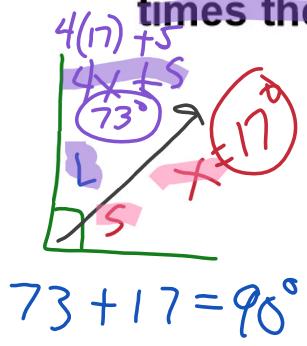


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Pear Deck Interactive Slide  
Do not remove this bar**Example 1**

## Complementary and Supplementary Angles

Find the measures of two complementary angles if the measure of the larger angle is five more than four times the measure of the smaller angle.



$$\begin{array}{rcl} L & S & ? (x) \\ 4x+5 + 1x & = 90 \\ 5x & = 90 - 5 \\ \hline 5x & = 85 \end{array}$$

$$x = 17^\circ$$



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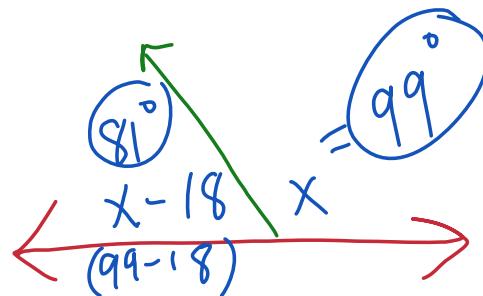
### Example 1

#### Complementary and Supplementary Angles

#### Check

The difference between the measures of two supplementary angles is  $18^\circ$ . Find the measure of each angle.

$$\begin{array}{rcl} x - 18 + x & = 180 \\ 2x - 18 & = 180 \\ \hline 2x & = 198 \\ x & = 99^\circ \end{array}$$



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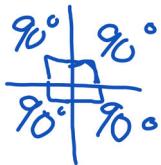
### Learn

#### Perpendicularity

Lines, segments, or rays that intersect at right angles are **perpendicular**. Segments or rays can be perpendicular to lines or other line segments and rays. The right angle symbol indicates that the lines are perpendicular.

symptom indicates that the mucus air permeability.

~~Non-Ex~~



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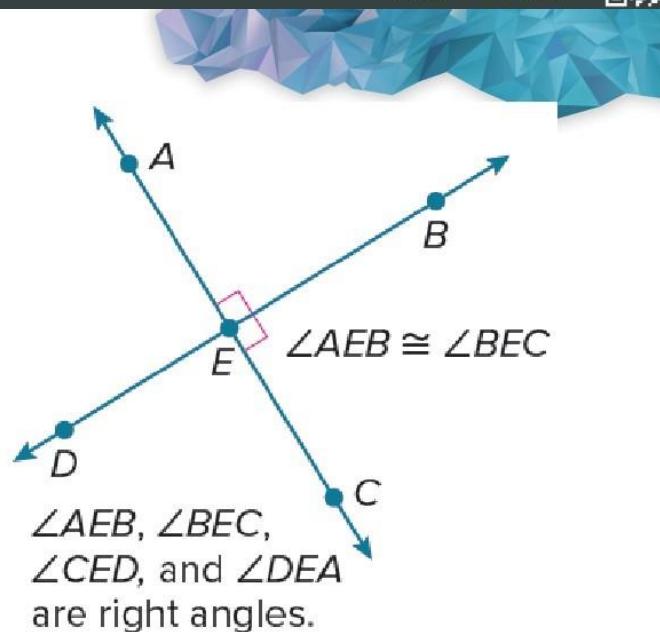


## Learn

## Perpendicularity

Perpendicular lines intersect to form Right angles

Perpendicular lines intersect to form 4 congruent adjacent angles, each 90 degrees.



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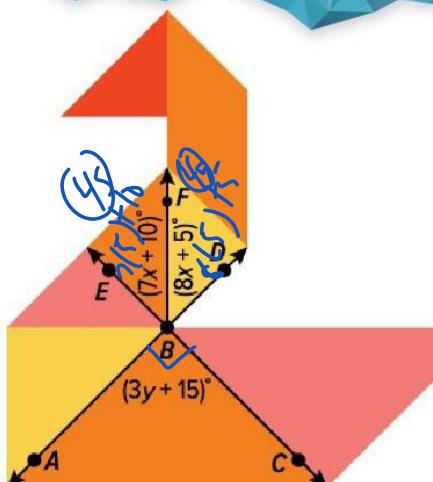
## Example 2

## Perpendicular Lines

**TANGRAMS** The tangram is a puzzle consisting of eight flat shapes called *tans* which are put together to form images. Find the values of  $x$  and  $y$  such that  $\overleftrightarrow{AD}$  and  $\overleftrightarrow{EC}$  in the tangram are perpendicular. 90°

**Start with solving for x first.**

$$\begin{array}{r}
 7x + 10 + 8x + 5 = 90 \\
 15x + 15 = 90 \\
 \hline
 15x = 75 \\
 x = 5
 \end{array}$$





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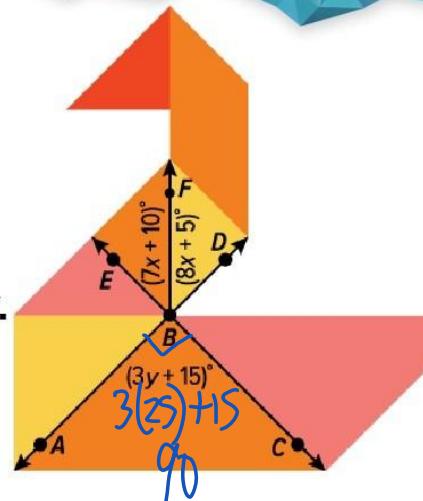


## Example 2

### Perpendicular Lines

**TANGRAMS** The tangram is a puzzle consisting of eight flat shapes called *tans* which are put together to form images. Find the values of  $x$  and  $y$  such that  $\overleftrightarrow{AD}$  and  $\overleftrightarrow{EC}$  in the tangram are perpendicular. Next solve for  $y$ .

$$\begin{array}{r} 3y + 15 = 90 \\ -15 \quad -15 \\ \hline 3y = 75 \\ \frac{3y}{3} \quad \frac{75}{3} \\ \hline y = 25 \end{array}$$



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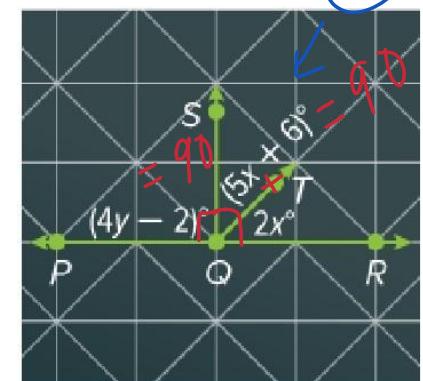
## Example 2

### Perpendicular Lines

#### Check

**DESIGN** Find the values of  $x$  and  $y$  such that  $\overrightarrow{PR}$  and  $\overrightarrow{QS}$  are perpendicular. Solve for  $x$  first.

$$\begin{array}{l} x = 12 \\ 5x + 6 + 2x = 90 \\ 7x + 6 = 90 \\ \cancel{-6} \quad \cancel{-6} \\ 7x = 84 \\ \frac{7x}{7} \quad \frac{84}{7} \\ x = 12 \end{array}$$



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## Example 2

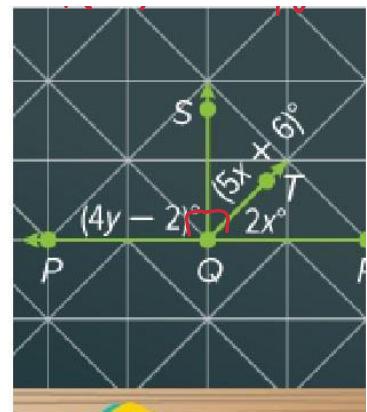
### Perpendicular Lines

#### Check

$$4(23) - 2 = 90^\circ$$

**DESIGN** Find the values of  $x$  and  $y$  such that  $\overrightarrow{PR}$  and  $\overrightarrow{QS}$  are perpendicular. Solve for  $y$  next.

$$\begin{array}{r} 4y + 2 = 90 \\ \hline 4y = 92 \\ \hline y = 23 \end{array}$$



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