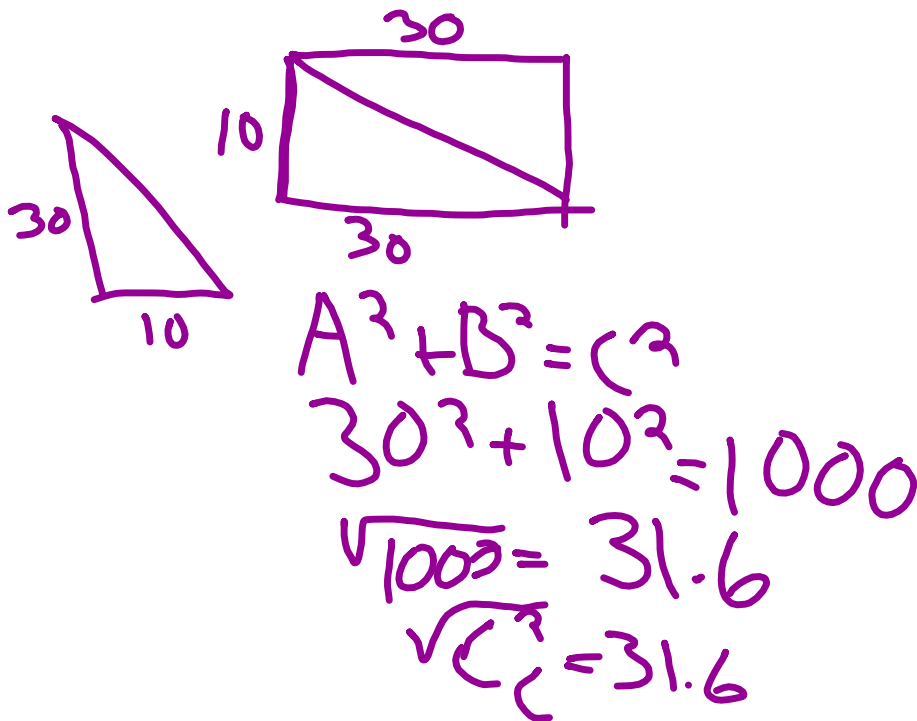


Warm Up

5/1

Check your homework with the answer key



Name Key Block _____ Date _____

Pythagorean Theorem and Transformations Practice

Use the Pythagorean Theorem to solve the following problems. Drawing pictures is always helpful! Show all work and round answers to the nearest tenth.

1. Marc wants to support a tree with a 6-foot wire that is attached to the ground 3 feet from the base of the tree. How high up the tree will Marc be able to put the wire?

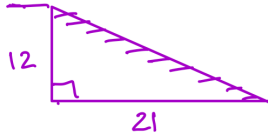
$$\begin{aligned} a^2 + b^2 &= c^2 \\ 3^2 + b^2 &= 6^2 \\ 9 + b^2 &= 36 \\ -9 &\quad -9 \\ \hline b^2 &= 27 \end{aligned}$$

$$\begin{aligned} \sqrt{b^2} &= \sqrt{27} \\ b &= 5.2 \end{aligned}$$

The wire will be attached 5.2 feet above the ground.



2. Dahlia is trying to figure out the length of a staircase she will need for a deck that is 12 feet high. She wants to start the stairs 21 feet from the deck. How long will her staircase need to be?



$$\begin{aligned} a^2 + b^2 &= c^2 \\ 12^2 + 21^2 &= c^2 \\ 144 + 441 &= c^2 \\ \sqrt{585} &= \sqrt{c^2} \\ 24.2 &= c \end{aligned}$$

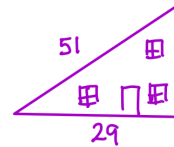
The staircase needs to be 24.2 feet long.

3. In a right triangle shaped house, the roof is 51 feet long (yes, it comes down to the ground) and the base of the house is 29 feet across. Calculate the height of the house at its highest point.

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 29^2 + b^2 &= 51^2 \\ 841 + b^2 &= 2601 \\ -841 &\quad -841 \\ \hline b^2 &= 1760 \end{aligned}$$

$$\begin{aligned} \sqrt{b^2} &= \sqrt{1760} \\ b &= 42.0 \end{aligned}$$

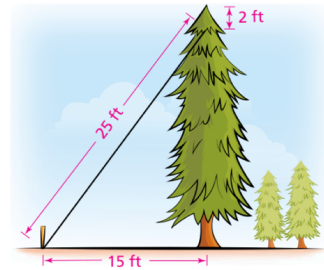
The house is 42 feet tall.



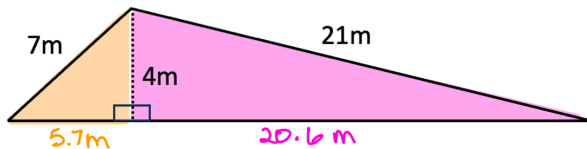
4. At an evergreen farm, the taller trees are braced by wires. A wire extends from 2 feet below the top of the tree to a stake in the ground. What is the tallest tree that can be braced with a 25-foot wire staked 15 feet from the base of the tree?

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 15^2 + b^2 &= 25^2 \\ 225 + b^2 &= 625 \\ b^2 &= 400 \\ \sqrt{b^2} &= \sqrt{400} \\ b &= 20 \end{aligned}$$

The tallest tree would be 22 feet tall.



5. Find the missing length of the triangle:



Total length is $5.7m + 20.6m = 26.3m$

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 4^2 + b^2 &= 7^2 \\ 16 + b^2 &= 49 \\ -16 &\quad -16 \\ \hline b^2 &= 33 \\ \sqrt{b^2} &= \sqrt{33} \\ b &= 5.7 \end{aligned}$$

$$\begin{aligned} a^2 + b^2 &= c^2 \\ 4^2 + b^2 &= 21^2 \\ 16 + b^2 &= 441 \\ -16 &\quad -16 \\ \hline b^2 &= 425 \\ \sqrt{b^2} &= \sqrt{425} \\ b &= 20.6 \end{aligned}$$

6. Do the following measurements represent the sides of a right triangle? If there is not a right angle, is it an obtuse or an acute angle?

5, 11, 13

$$a^2 + b^2 = c^2$$

$$5^2 + 11^2 \stackrel{?}{=} 13^2$$

$$25 + 121 \stackrel{?}{=} 169$$

$$146 \neq 169$$

Not a right angle; it is obtuse.



4, 7.5, 8.5

$$a^2 + b^2 = c^2$$

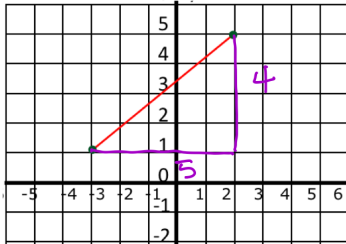
$$4^2 + 7.5^2 \stackrel{?}{=} 8.5^2$$

$$16 + 56.25 \stackrel{?}{=} 72.25$$

$$72.25 = 72.25 \checkmark$$

This is a right triangle!

7. What is the length of the line on the graph below?



$$a^2 + b^2 = c^2$$

$$4^2 + 5^2 = c^2$$

$$16 + 25 = c^2$$

$$41 = c^2$$

$$\sqrt{41} = \sqrt{c^2}$$

$$6.4 = c$$

6.4 units

8. What is the distance between the points (7, 2) and (3, 9)?

$$-4 < \begin{matrix} 7, 2 \\ 3, 9 \end{matrix} > +7$$

$$a^2 + b^2 = c^2$$

$$4^2 + 7^2 = c^2$$

$$16 + 49 = c^2$$

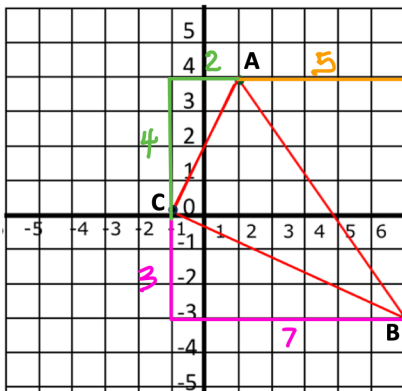
$$65 = c^2$$

$$\sqrt{65} = \sqrt{c^2}$$

$$8.1 = c$$

8.1 units

9. Prove whether or not triangle ABC is a right triangle.



First find all side lengths.

\overline{AB}

$$a^2 + b^2 = c^2$$

$$7^2 + 5^2 = c^2$$

$$49 + 25 = c^2$$

$$74 = c^2$$

$$\sqrt{74} = \sqrt{c^2}$$

$$8.6 = c$$

\overline{BC}

$$a^2 + b^2 = c^2$$

$$3^2 + 7^2 = c^2$$

$$9 + 49 = c^2$$

$$58 = c^2$$

$$\sqrt{58} = \sqrt{c^2}$$

$$7.6 = c$$

\overline{AC}

$$a^2 + b^2 = c^2$$

$$4^2 + 2^2 = c^2$$

$$16 + 4 = c^2$$

$$20 = c^2$$

$$\sqrt{20} = \sqrt{c^2}$$

$$4.5 = c$$

Now let's check if a 4.5, 7.6, 8.6 triangle is a right triangle.

$$a^2 + b^2 = c^2$$

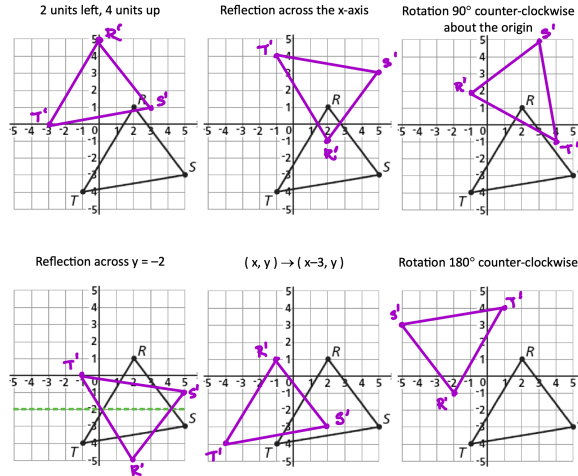
$$4.5^2 + 7.6^2 \stackrel{?}{=} 8.6^2$$

$$20.25 + 57.76 \stackrel{?}{=} 73.96$$

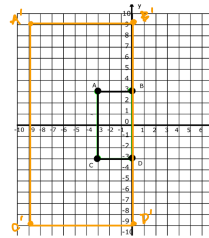
$$78.01 \neq 73.96$$

ABC is NOT a right triangle.

Perform the following transformations. (#s 10-15)



16. Graph the image of rectangle ABCD after a dilation of scale factor 3 centered at the origin.



Preimage	Image
Length AB 3 units	Length A'B' 9 units
Length AC 6 units	Length A'C' 18 units
Perimeter ABCD 18 units	Perimeter A'B'C'D' 54 units
Area ABCD 18 units ²	Area A'B'C'D' 162 units ²

Are the Image and Preimage congruent or similar?

Similar

What is the ratio of the lengths between the Preimage & Image?

Ratio = 3

What is the ratio for the areas between the Preimage and Image?

Ratio = 9

$$1 \begin{matrix} \boxed{A=1} \\ 1 \end{matrix} \xrightarrow{\text{dilate factor: } 3}$$

$$3 \begin{matrix} \boxed{A=9} \\ 3 \end{matrix} \quad \text{Factor} = 3 \\ \text{Area} \times 9$$

$$1 \begin{matrix} \boxed{A=1} \\ 1 \end{matrix} \xrightarrow{(x,y) \rightarrow (2x, 2y)}$$

$$2 \begin{matrix} \boxed{A=4} \\ 2 \end{matrix} \quad \text{Factor} = 2 \\ \text{Area} \times 4$$

$$1 \begin{matrix} \boxed{A=1} \\ 1 \end{matrix} \xrightarrow{(x,y) \rightarrow (4x, 4y)}$$

$$4 \begin{matrix} \boxed{A=16} \\ 4 \end{matrix} \quad \text{Factor} = 4 \\ \text{Area} \times 16$$

Scale factor = 5

Factor = 5
Area $\times 25$

$$x \begin{matrix} \boxed{x^2} \\ x \end{matrix} \rightarrow 2x \begin{matrix} \boxed{4x^2} \\ 2x \end{matrix} = (2^2) x^2$$

$$\begin{aligned} V &= l \cdot w \cdot h \\ &= 2l \cdot 2w \cdot 2h \\ &= 8(l \cdot w \cdot h) \end{aligned}$$

17. Rectangle ABCD has a perimeter of 16 units. Side AB is 3 units. ABCD is dilated to form rectangle A'B'C'D' where side A'B' is 6.6 units.

What is the Scale factor? Show how you calculated it.

$$\text{Scale Factor} = \frac{\text{Image}}{\text{Preimage}} = \frac{6.6}{3} = 2.2$$

Scale Factor = 2.2

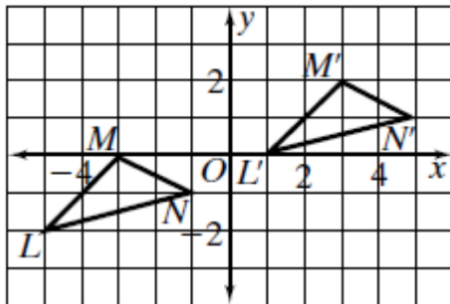
What is the perimeter of A'B'C'D'?

$$16 \cdot 2.2 = 35.2$$

Perimeter 35.2 units

What was the transformation? Describe the transformation in words.

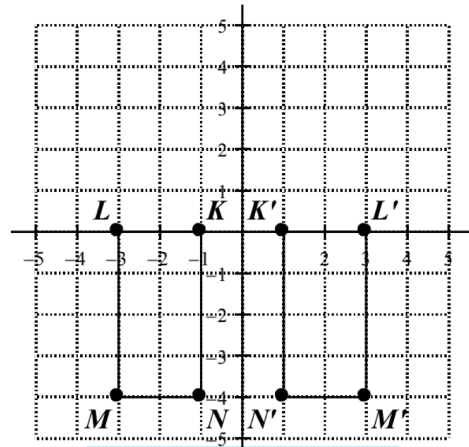
18.



Translation
Up 2, Right 6

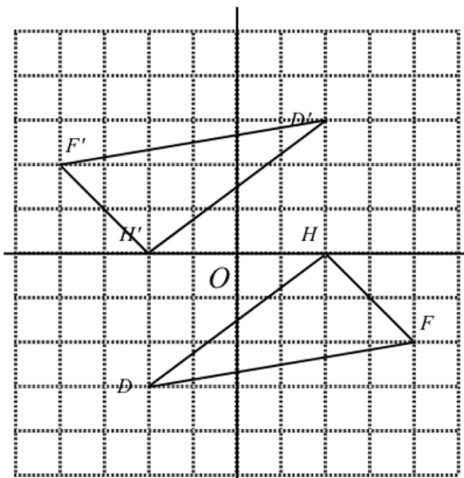
$$(x, y) \rightarrow (x+6, y+2)$$

19.



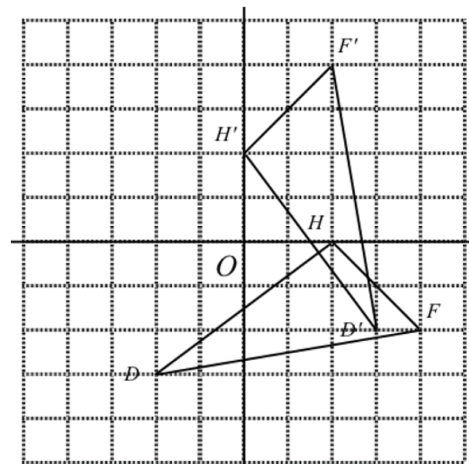
Reflection over y-axis

20.



180° Rotation
around the origin

21.



Rotate 90° counter
clockwise around
the origin.

Angle Vocabulary

Acute Angle: less than 90°

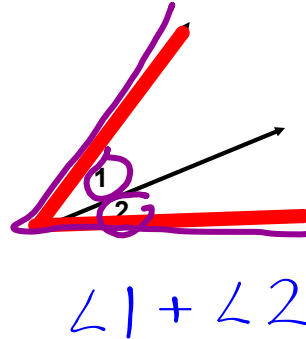
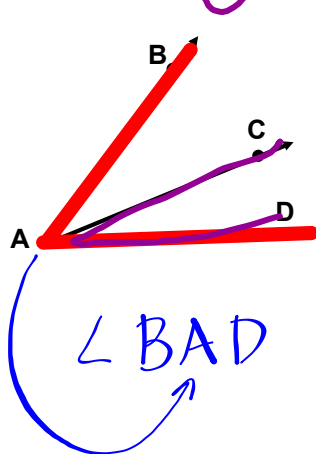
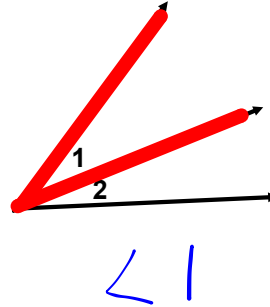
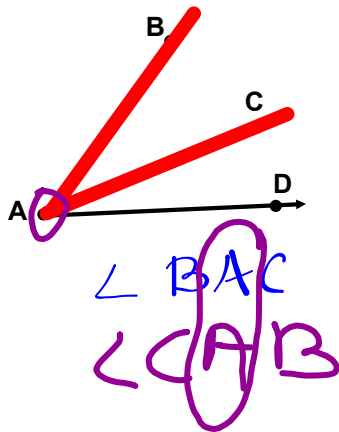
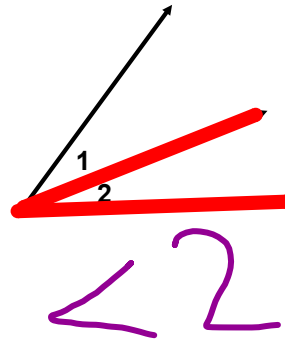
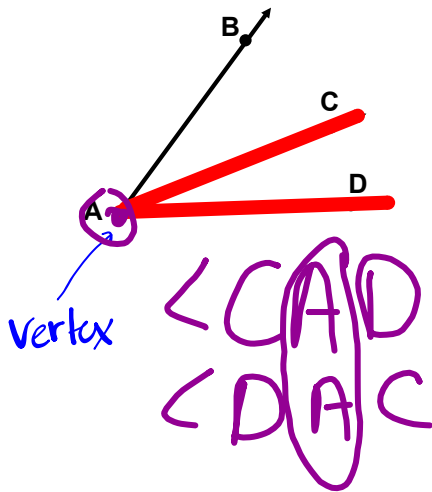
Obtuse Angle: greater than 90°

Straight Angle: 

Complementary Angles: add to 90°

Supplementary Angles: add to 180°

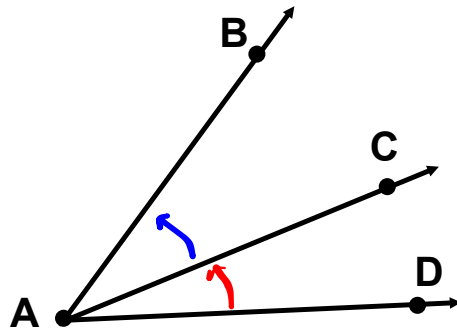
How do we label angles?



$\angle BAD$
 $\angle DAB$

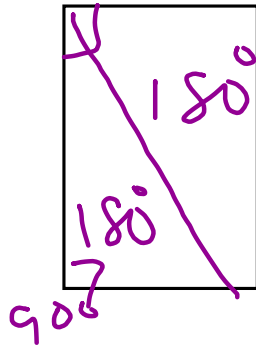
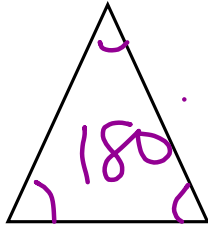
Adjacent Angles

Next
to

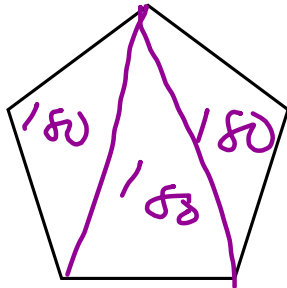


$\angle BAC$ $\angle CAD$

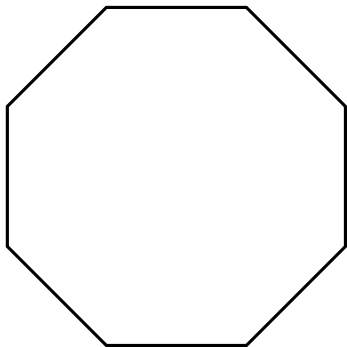
Triangles:



360°



540°



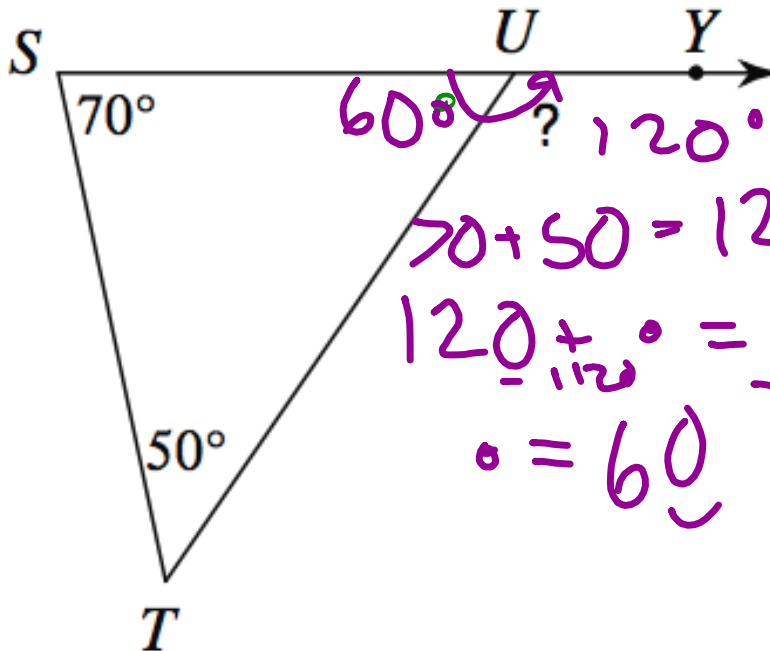
Exterior Angle Theorem

(not as fancy as it sounds)

To solve a problem using the "Exterior Angle Theorem," all we need to know is:

<p>Triangle = 180°</p> <p>Straight Angle = 180°</p>

$$180 - 60 = 120^\circ$$



Classwork

Complete pages 1-3 of Angles Packet

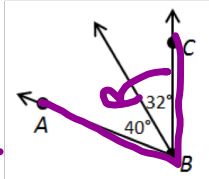
Stop at the end of the page that says "**Supplementary**".

Angles, Angles, Everywhere!

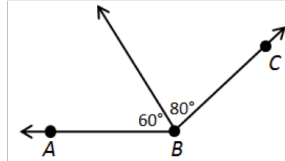
Find the measure of $\angle ABC$.

1. $m\angle ABC =$ 72

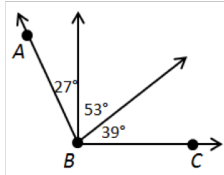
40 + 32



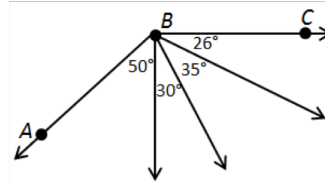
2. $m\angle ABC =$ _____



3. $m\angle ABC =$ _____

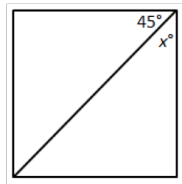


4. $m\angle ABC =$ _____

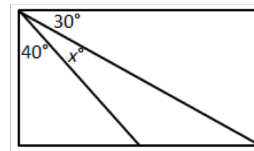


Find the value of x .

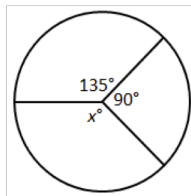
5. $x =$ _____



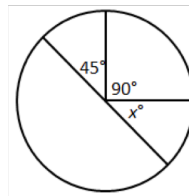
6. $x =$ _____



7. $x =$ _____



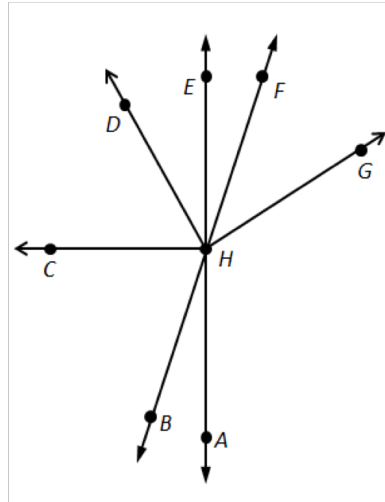
8. $x =$ _____



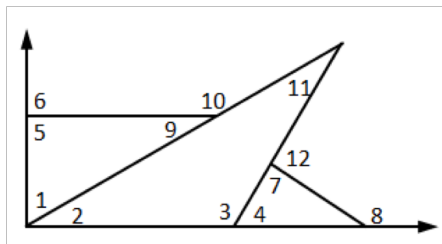
Classifying Angles

Tell if the angle appears to be *acute*, *right*, *obtuse*, or *straight*.

1. $\angle CHF$ _____
2. $\angle CHA$ _____
3. $\angle EHF$ _____
4. $\angle DHC$ _____
5. $\angle BHF$ _____
6. $\angle BHA$ _____
7. $\angle EHG$ _____
8. $\angle CHG$ _____
9. $\angle AHE$ _____
10. $\angle GHA$ _____



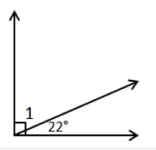
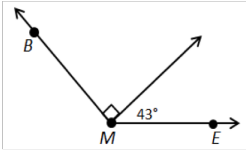
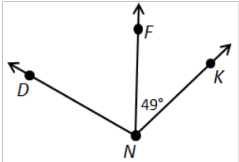
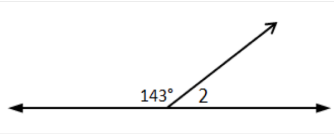
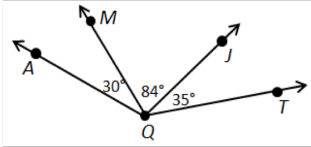
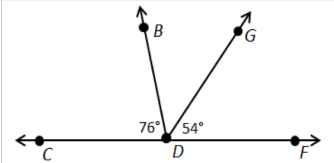
Write each numbered angle in the correct column. Two are done for you.



Acute Angles	Right Angles	Obtuse Angles
$\angle 1$	$\angle 5$	

Missing Measures

Find the angle measure.

<p>1. $m\angle 1 =$ _____</p> 	<p>2. $m\angle BME =$ _____</p> 
<p>3. $m\angle DNK = 110^\circ$ $m\angle DNF =$ _____</p> 	<p>4. $m\angle 2 =$ _____</p> 
<p>5. $m\angle AQJ =$ _____ 6. $m\angle MQT =$ _____ 7. $m\angle AQT =$ _____</p>	
<p>8. $m\angle BDG =$ _____ 9. $m\angle CDG =$ _____ 10. $m\angle BDF =$ _____</p>	

Working With Adjacent Angles

Correctly answer each question below.

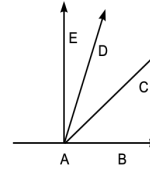
1) What is the adjacent angle to $\angle BAC$?

2) What is the adjacent angle to $\angle BAD$?

3) What is the adjacent angle to $\angle CAE$?

4) What two angles are adjacent angles to $\angle CAD$?

Figure A.

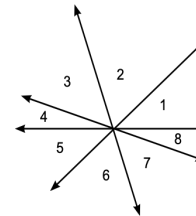


1) What are the two adjacent angles to $\angle 3$?

2) What is the smallest adjacent angle to $\angle 7$?

3) What are the adjacent angles to $\angle 5$?

Figure B.



Adjacent: _____

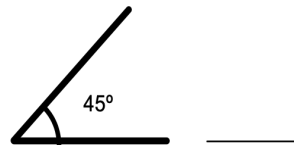
Working With Complementary Angles

Part 1: Give the measurement for the complementary angle for each angle below.

- | | |
|---------------------|---------------------|
| A) 45° _____ | F) 62° _____ |
| B) 30° _____ | G) 89° _____ |
| C) 20° _____ | H) 77° _____ |
| D) 80° _____ | I) 38° _____ |
| E) 55° _____ | J) 5° _____ |

Part 2: For each figure below, draw the complementary angle and label its measurement

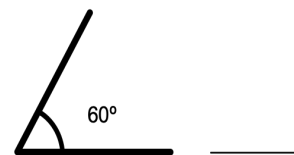
A)



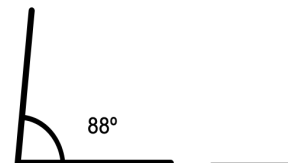
B)



C)



D)



Complementary: _____

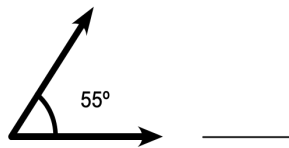
Working With Supplementary Angles

Part 1: Give the measurement for the supplementary angle for each angle below.

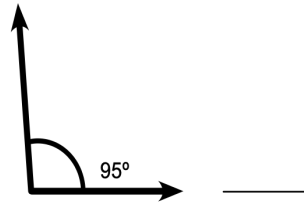
- | | |
|----------------------|----------------------|
| A) 60° _____ | F) 25° _____ |
| B) 110° _____ | G) 170° _____ |
| C) 45° _____ | H) 82° _____ |
| D) 90° _____ | I) 39° _____ |
| E) 150° _____ | J) 107° _____ |

Part 2: For each figure below, draw the supplementary angle and label its measurement

A)



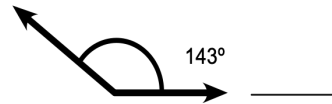
B)



C)



D)



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Supplementary: _____



Homework

Finish classwork