Warm Up

Questions from yesterday's work?

Check with the answer key.

Name Key Block _____ Date _____

Pythagorean Theorem and Transformations Practice

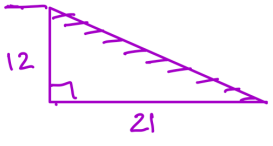
Use the Pythagorean Theorem to solve the following problems. Drawing pictures is always helpful! Show all work and round answers to the nearest tenth.

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?

$a^2+b^2=c^2$
$3^2+b^2=6^2$
$9+b^2=36$
$-9 \quad -9$
$b^2=27$
$\sqrt{b^2}=\sqrt{27}$
$b=5.2$

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?



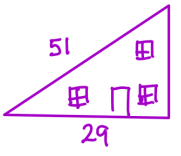
$a^2+b^2=c^2$
$12^2+21^2=c^2$
$144+441=c^2$
$\sqrt{585}=\sqrt{c^2}$
$24.2=c$

The staircase needs to be 24.2 feet long.

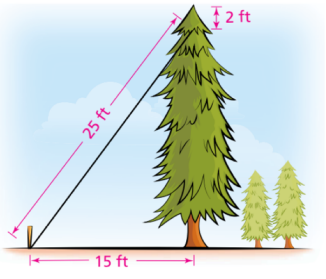
3. In a right triangle shaped house, the roof is 51 feet long (yes, it comes down to the ground) and the base of the house is 29 feet across. Calculate the height of the house at its highest point.

$a^2+b^2=c^2$
$29^2+b^2=51^2$
$841+b^2=2601$
$-841 \quad -841$
$b^2=1760$
$\sqrt{b^2}=\sqrt{1760}$
$b=42.0$

The house is 42 feet tall.



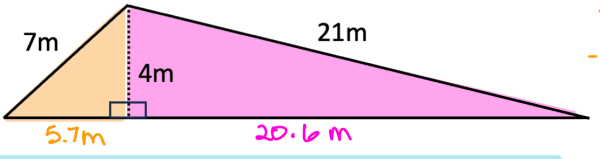
4. At an evergreen farm, the taller trees are braced by wires. A wire extends from 2 feet below the top of the tree to a stake in the ground. What is the tallest tree that can be braced with a 25-foot wire staked 15 feet from the base of the tree?



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

The tallest tree would be 22 feet tall.

5. Find the missing length of the triangle:



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

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

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

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

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

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

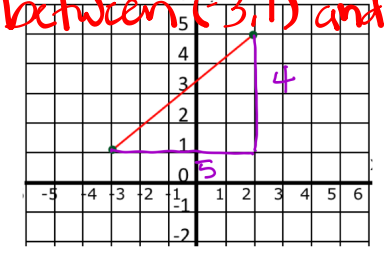
$16 + 56.25 \stackrel{?}{=} 72.25$

$72.25 = 72.25$ ✓

This is a right triangle!

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

What is the distance between (-3, 1) and (2, 5)



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

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

$16+25=c^2$

$41=c^2$

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

$6.4=c$

6.4 units

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

7, 2

3, 9

-4 -4 $+7$ $+7$

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

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

$16+49=c^2$

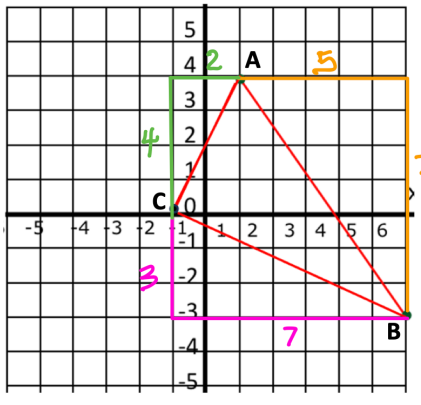
$65=c^2$

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

$8.1=c$

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.

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

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

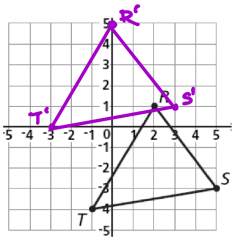
$20.25+57.76 \stackrel{?}{=} 73.96$

$78.01 \neq 73.96$

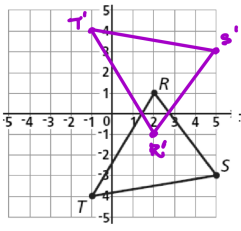
ABC is NOT a right triangle.

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

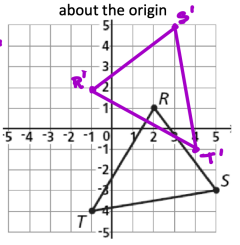
2 units left, 4 units up



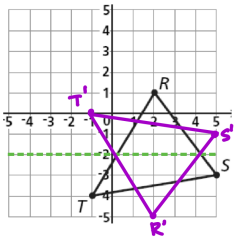
Reflection across the x-axis



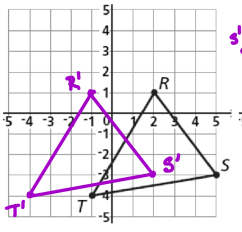
Rotation 90° counter-clockwise about the origin



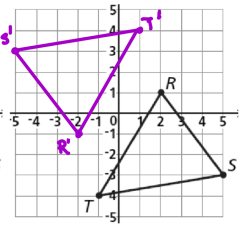
Reflection across y = –2



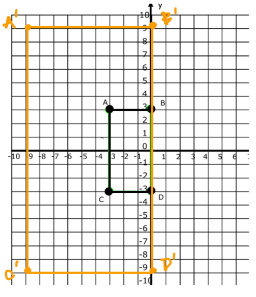
(x, y) → (x–3, y)



Rotation 180° counter-clockwise



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 units²	Area A'B'C'D'	162 units²

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 | A=1 | 1 — dialate factor = 3 → 3 | A=9 | 3 — Scale Factor=3, Area x 9

1 | A=1 | 1 — (x,y)→(2x,2y) → 2 | A=4 | 2 — Scale Factor= 2, Area x 4

1 | A=1 | 1 — (x,y)→(4x,4y) → 4 | A=16 | 4 — Scale Factor= 4, Area x 16

Scale factor = 5

Area will be 25 x the area of the preimage

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.

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

Scale Factor = 2.2

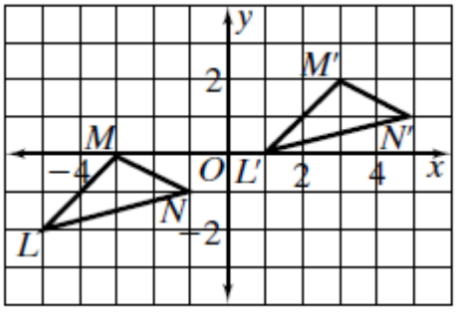
What is the perimeter of A'B'C'D'?

$16 \cdot 2.2 = 35.2$

Perimeter 35.2 units

What was the transformation? Describe the transformation in words.

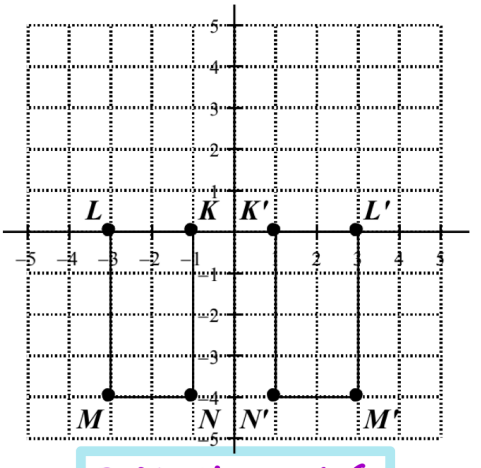
18.



Translation Up 2, Right 6

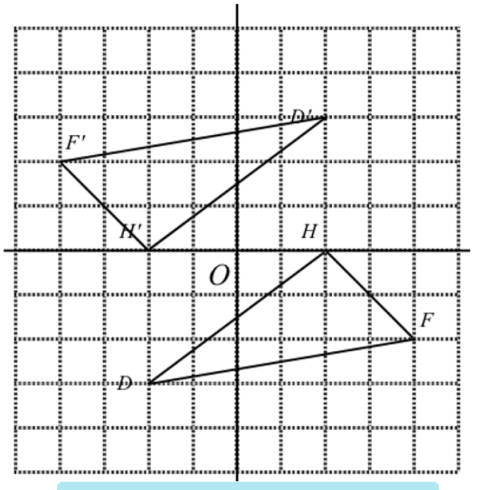
$(x, y) \rightarrow (x+6, y+2)$

19.



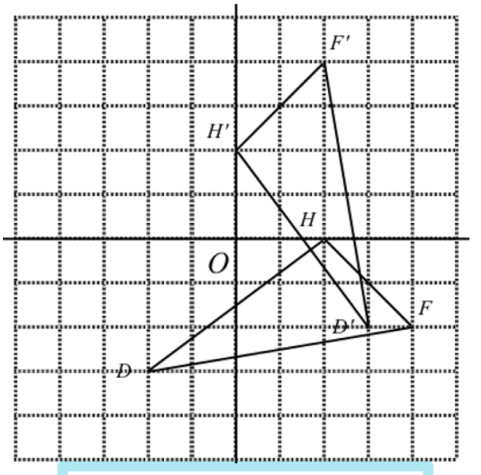
Reflection over y-axis

20.



180° Rotation around the origin

21.



Rotate 90° counter clockwise around the origin.

Angle Vocabulary

Acute Angle: Less than 90° $< 90°$

A "cute" little angle

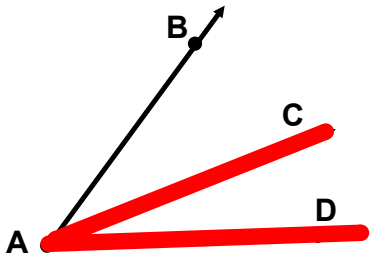
Obtuse Angle: Greater than 90° $> 90°$

Straight Angle:  180°

Complementary Angles: add up to 90°

Supplementary Angles: add up to 180°

How do we label angles?

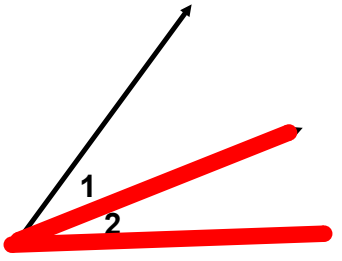


Vertex

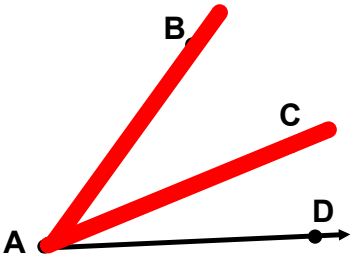
∠CAD

∠DAC

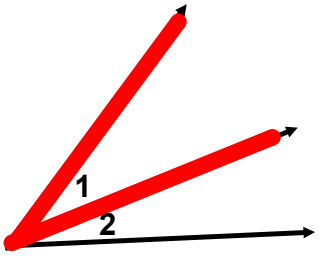
Vertex



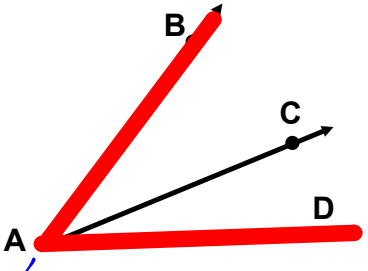
∠2



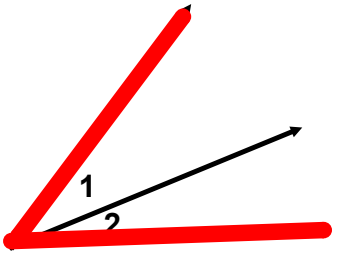
∠BAC



∠1



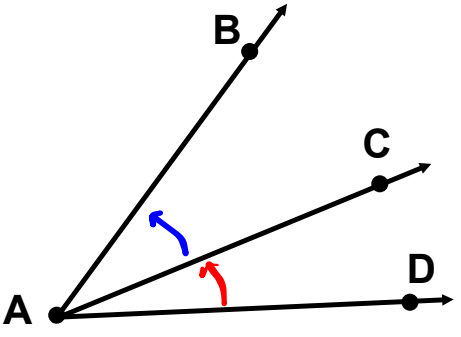
∠BAD



∠1 + ∠2

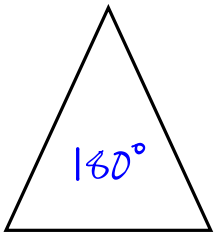
Adjacent Angles

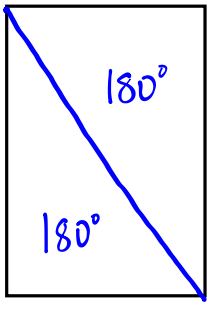
Next to



$\angle BAC$ is adjacent to $\angle DAC$

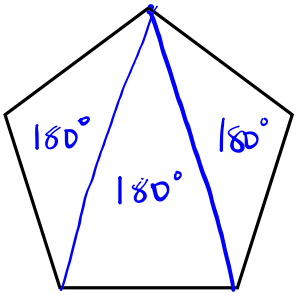
Triangles:





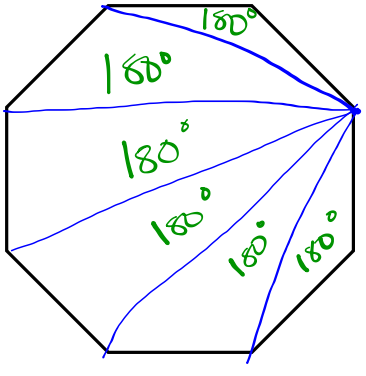
Total 360°

180° + 180° = 360°



Total degrees in a pentagon

180° + 180° + 180° = 540°



1080°

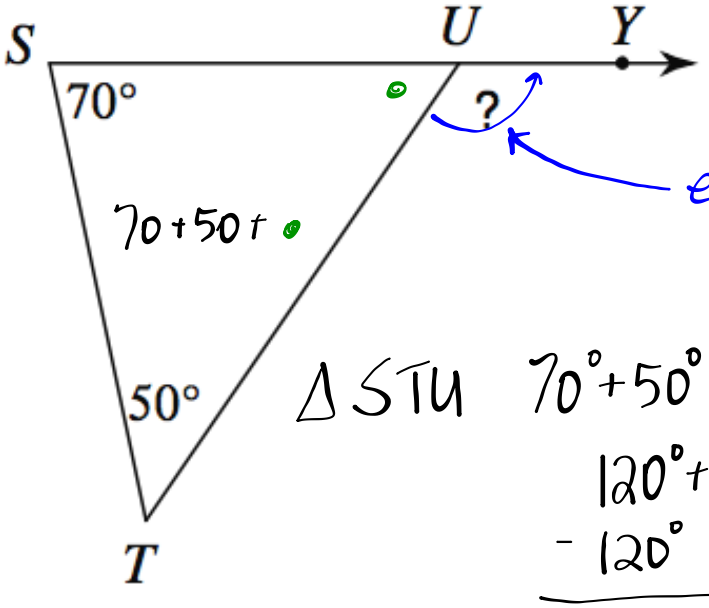
Always make triangles starting at the same point.

Exterior Angle Theorem

(not as fancy as it sounds)

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

Triangle = 180°
Straight Angle = 180°



$\triangle STU$ $70^\circ + 50^\circ + o = 180^\circ$

$120^\circ + o = 180^\circ$

$-120^\circ \quad -120^\circ$

$o = 60^\circ$

We know $? + o = 180^\circ$

$? + 60 = 180^\circ$

$-60 \quad -60$

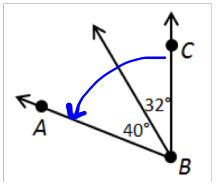
$? = 120^\circ$

Angles, Angles, Everywhere!

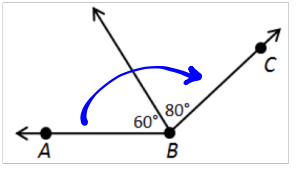
Find the measure of $\angle ABC$.

1. $m\angle ABC =$ _____

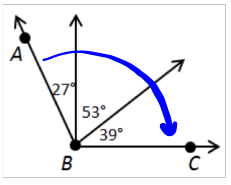
measure of...



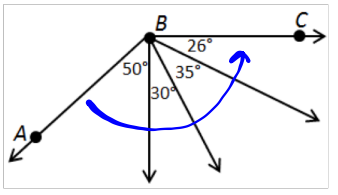
2. $m\angle ABC =$ _____



3. $m\angle ABC =$ _____

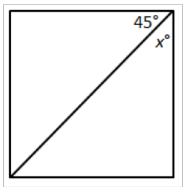


4. $m\angle ABC =$ _____

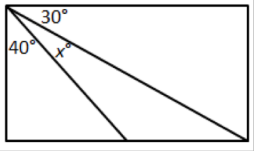


Find the value of x.

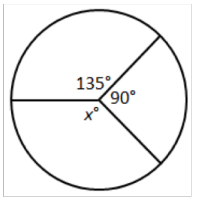
5. $x =$ _____



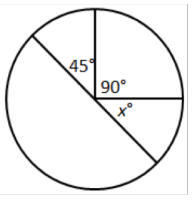
6. $x =$ _____



7. $x =$ _____



8. $x =$ _____



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Classifying Angles

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

1. ∠*CHF* _____

2. ∠*CHA* _____

3. ∠*EHF* _____

4. ∠*DHC* _____

5. ∠*BHF* _____

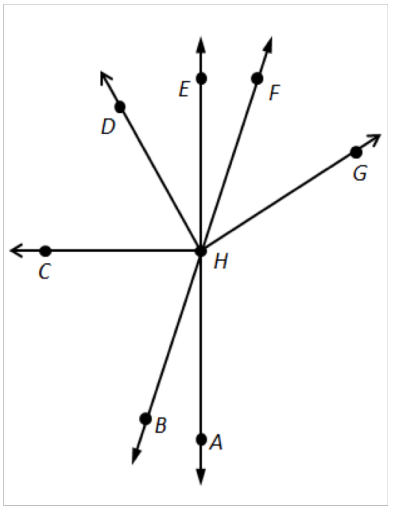
6. ∠*BHA* _____

7. ∠*EHG* _____

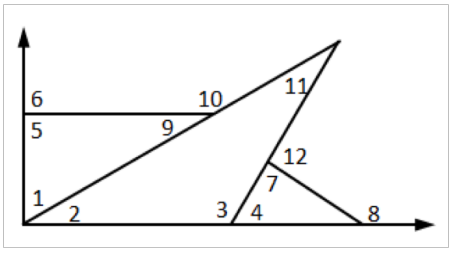
8. ∠*CHG* _____

9. ∠*AHE* _____

10. ∠*GHA* _____



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



Acute Angles	Right Angles	Obtuse Angles
∠1	∠5	

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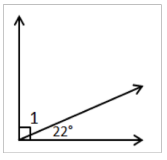
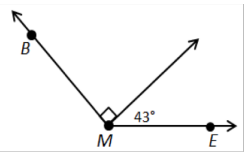
Missing Measures

Find the angle measure.

1. $m\angle 1$ = _____

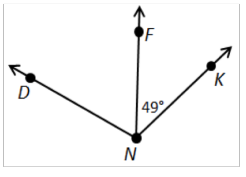


2. $m\angle BME$ = _____

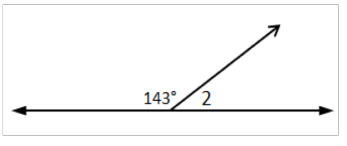


3. $m\angle DNK = 110°$

$m\angle DNF$ = _____



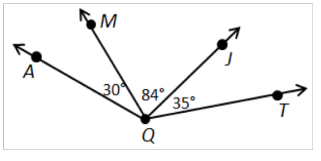
4. $m\angle 2$ = _____



5. $m\angle AQJ$ = _____

6. $m\angle MQT$ = _____

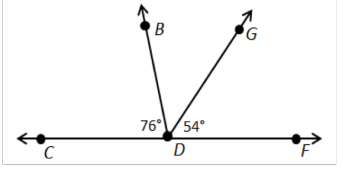
7. $m\angle AQT$ = _____



8. $m\angle BDG$ = _____

9. $m\angle CDG$ = _____

10. $m\angle BDF$ = _____



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Working With Adjacent Angles

Correctly answer each question below.

1) What is the adjacent angle to ∠BAC?

_____

2) What is the adjacent angle to ∠BAD?

_____

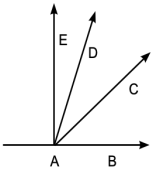
3) What is the adjacent angle to ∠CAE?

_____

4) What two angles are adjacent angles to ∠CAD?

_____

Figure A.



---

1) What are the two adjacent angles to ∠3?

_____

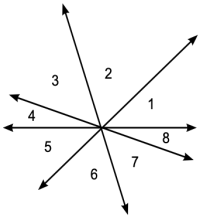
2) What is the smallest adjacent angle to ∠7?

_____

3) What are the adjacent angles to ∠5?

_____

Figure B.



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Adjacent: _____

Working With Complementary Angles

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

A) 45º _____

B) 30º _____

C) 20º _____

D) 80º _____

E) 55º _____

F) 62º _____

G) 89º _____

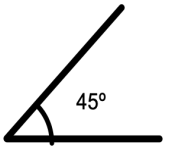
H) 77º _____

I) 38º _____

J) 5º _____

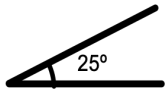
Part 2: For each figure below, draw the complementary angle and label its measurement

A)



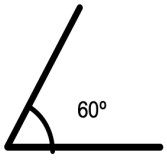
_____

B)



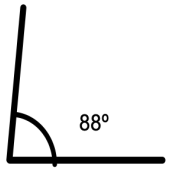
_____

C)



_____

D)



_____

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Complementary: _____

Working With Supplementary Angles

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

A) 60º _____

B) 110º _____

C) 45º _____

D) 90º _____

E) 150º _____

F) 25º _____

G) 170º _____

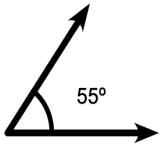
H) 82º _____

I) 39º _____

J) 107º _____

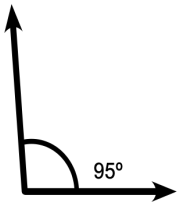
Part 2: For each figure below, draw the supplementary angle and label its measurement

A)



_____

B)



_____

C)

_____

D)

_____

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Supplementary: _____