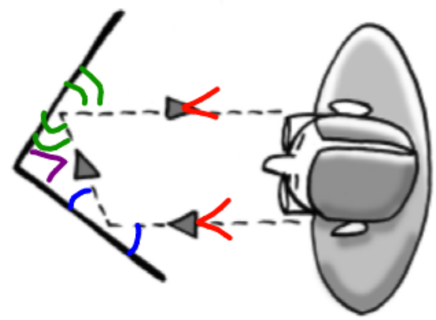
Homework Check: The answers are in your text.
Questions about specific problems?

You just made closure for Chapter 1 ... what might you expect to see in the coming week?

Team Quiz Time: 1/4/18

- **Collaborate/Compare/Discuss. Do your own work. Show all work. Ensure teammates would be satisfied with score earned by your work & results.**
- **Use INB, pencil, eraser, scientific calculator.**
- ***No phones out when quizzes are out***
- **Stack team's quizzes at table when finished for me to collect; then, preview Lesson 2.1.1.**
- **If you want to access accommodations for extended time/alternative location, please write where to route your quiz, and/or Room Number & date/time where & when you will complete the quiz, such as, "→ Rebecca → Jordan," or, "*Finish in Rm 704, 9/15 @ 3:35.*"**

Objective(s): You will learn names & angle measure relationships for certain geometric angle relationships.

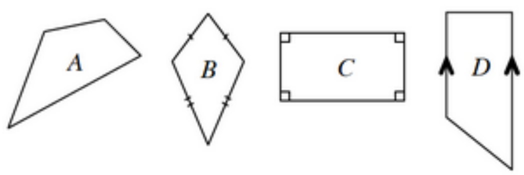


Agenda:

- HW Review (Teams)
- HW Quiz (Teams)
- 2.1.1 Activity (Teams)
  > 2-1 Experiment with "corner reflectors;" label diagram in spiral.
  > 2-2 Include all diagrams (in *b*, list all the angles with measures less than 180^{o}).
  > 2-3, 2-4 Show all work. Include diagrams.
  > 2-5 (if time; otherwise, is HW)
- Assign HW

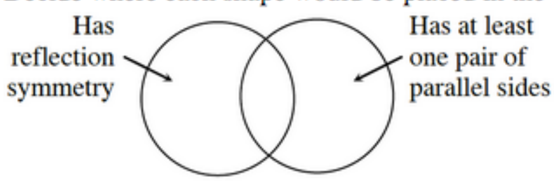
January 04, 2018

CL 1-132. Examine the shapes below.



a. Describe what you know about each shape based on the information provided in the diagram. Then name the shape.

b. Decide where each shape would be placed in the Venn diagram below.



CL 1-133. Solve each equation below. Check your solution.

a. $3x - 12 + 10 = 8 - 2x$

b. $\frac{x}{7} = \frac{3}{2}$

c. $5 - (x + 7) + 4x = 7(x - 1)$

d. $x^2 + 11 = 36$

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January 04, 2018

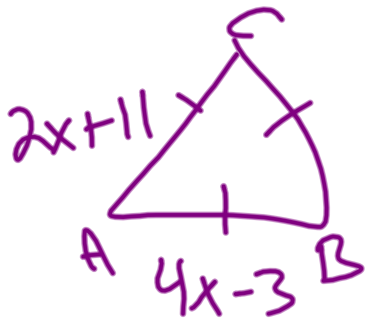
CL 1-135. Graph and connect the points in the table below. Then graph the equation in part (b) on the same set of axes. Also, find the equation for the data in the table.

a.

x	−4	−3	−2	−1	0	1	2	3	4	5	6
y	−5	−3	−1	1	3	5	7	9	11	13	15

b. $y = x^2 + x - 2$

1-136



$$2x+11 = 4x-3$$
$$-4x-11 \quad -4x-11$$
$$\frac{-2x}{-2} = \frac{-14}{-2}$$
$$\boxed{x=7}$$

$$AC = 2(7)+11 = 14+11 = 25$$

$$P_{\triangle ABC} = 3 \cdot 25 = \boxed{75_u}$$

2.1.1 What is the relationship?

Complementary, Supplementary, and Vertical Angles

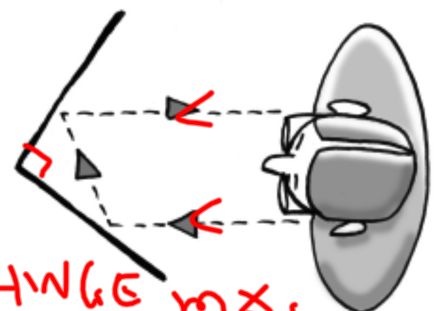
CW:2-1to2-4

(Distribute Hinged Mirrors)

2-1. SOMEBODY'S WATCHING ME

In order to see yourself in a small mirror, you usually have to be looking directly into it —if you move off to the side, you cannot see your image any more. But Mr. Douglas knows a neat trick. He claims that if he makes a right angle with a hinged mirror, he can see himself in the mirror no matter from which direction he looks into it.

a. By forming a right angle with a hinged mirror, test Mr. Douglas's trick for yourself. Look into the place where the sides of the mirror meet. Can you see yourself? what if you look in the mirror from a different angle?



b. Does the trick work for *any* angle between the sides of the mirror? Change the angle between the sides of the mirror until you can no longer see your reflection where the sides meet. MEASURE RANGE OF HINGE m∠s

c. Below is a diagram of a student trying out the mirror trick. What appears to be true about the lines of sight? Can you explain why Mr. Douglas's trick works? Talk about this with your team and be ready to share your ideas with the class. COPY & LABEL (MARK) DIAGRAM

2.1.1 What is the relationship? Answers

CW:2-1to2-4

Complementary, Supplementary, and Vertical Angles

(Distribute Hinged Mirrors)

2-1. SOMEBODY'S WATCHING ME

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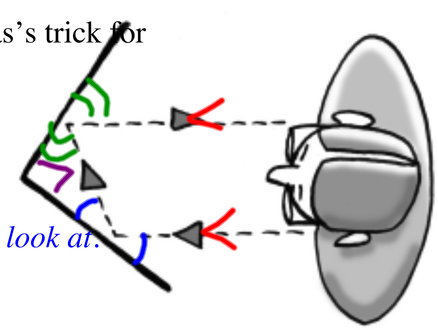
you move off to the side, you cannot see your image any more. But Mr. Douglas knows a neat
trick. He claims that if he makes a right angle with a hinged mirror, he can see himself in the mirror no matter from which direction he looks into it.

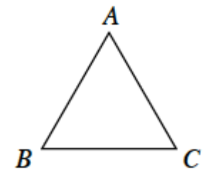
a. By forming a right angle with a hinged mirror, test Mr. Douglas's trick for yourself.
Look into the place where the sides of the mirror meet.
Can you see yourself? What if you
look in the mirror from a different angle?
when mirrors are at 90 degree angle, I can move them back & forth & see my reflection regardless of the angle I look at.



b. Does the trick work for *any* angle between the sides of the mirror? Change the angle between the sides of the mirror until you can no longer see your reflection where the sides meet. *only works from about 85 to 95 degrees*

c. Below is a diagram of a student trying out the mirror trick. What appears to be true about the lines of sight? Can you explain why Mr. Douglas's trick works? Talk about this with your team and be ready to share your ideas with the class. *lines of sight appear to be parallel & angles around bounces have equal measures for each bounce.*

• **2-2.** To completely understand how Mr. Douglas's reflection trick works, you need to learn more about the relationships between angles. But in order to clearly describe relationships between angles, you will need a convenient way to refer to and name them. Examine the diagram of equilateral ΔABC below.



CW:2-1to2-4

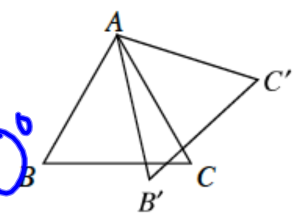
1.

The "top" of this triangle is usually referred to as "angle A," written $\angle A$. Point A is called the **vertex** of this angle. The measure of $\angle A$ (the number of degrees in angle A) is written $m\angle A$. Since ΔABC is equilateral, write an equation showing the relationship between its angles.

2.

Audrey rotated ΔABC around point A to form $\Delta AB'C'$. She told her teammate Maria, *"I think the two angles at A are equal."* Maria did not know which angles she was referring to. How many angles can you find at A? Are there more than three?

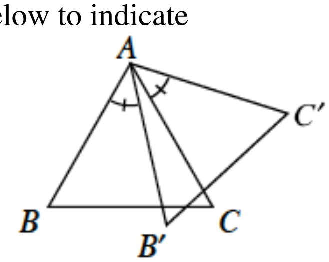
ONLY LIST ∡s W/m ∡s $\leq 180°$



1.

Maria asked Audrey to be more specific. She explained, "*One of my angles is $\angle BAB'$.*" At the same time, she marked her two angles with the same marking below to indicate that they have the same measure. Name her other angle.

Be sure to use three letters so there is no confusion about which angle you mean.

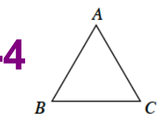


Answers

2-2. To completely understand how the reflection trick works, you need to learn more about the relationships between angles. But in order to clearly describe relationships between angles, you will need a convenient way to refer to and name them. Examine the diagram of equilateral ΔABC below.

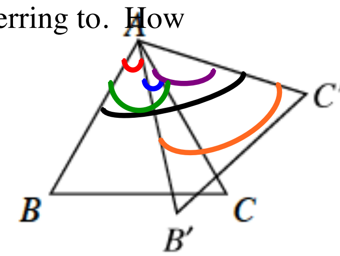
a. $m\measuredangle A = m\measuredangle B = m\measuredangle C$

CW:2-1to2-4



a. The "top" of this triangle is usually referred to as "angle A," written $\measuredangle A$. Point A is called the **vertex** of this angle. The measure of $\measuredangle A$ (the number of degrees in angle A) is written $m\measuredangle A$. Since ΔABC is equilateral, write an equation showing the relationship between its angles.

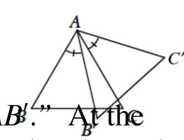
b. Audrey rotated ΔABC around point A to form $\Delta AB'C'$. She told her teammate Maria, *"I think the two angles at A are equal."* Maria did not know which angles she was referring to. How many angles can you find at A? Are there more than three?



b. 6 angles: ∡BAB' [or, ∡B'AB], ∡B'AC [or ∡CAB'],

∡BAC' [or ∡C'AB], ∡CAC' [or ∡C'AC], ∡BAC [or ∡CAB]

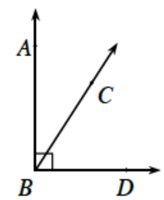
& ∡B'AC' [or ∡C'AB']



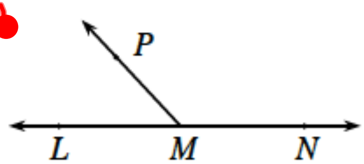
c. Maria asked Audrey to be more specific. She explained, "*One of my angles is ∡BAB'.*" At the same time, she marked her two angles with the same marking below to indicate that they have the same measure. Name her other angle. Be sure to use three letters so there is no confusion about which angle you mean. **c. m∡BAB'=m∡CAC' by definition of a rotation.**

- **2-3.** ANGLE RELATIONSHIPS **CW:2-1to2-4** **D**
- When you know two angles have a certain relationship, learning something about one of them tells you something about the other. Certain angle relationships come up often enough in geometry that they are given special names.

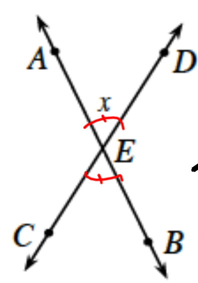
1. Two angles whose measures have a sum of 90° are called **complementary angles**. Since $\angle ABD$ is a right angle in the diagram below, angles $\angle ABC$ and $\angle CBD$ are complementary. If $m\angle CBD$ = 76°, what is $m\angle ABC$? Show how you got your answer.



2. Another special angle is 180°. If the sum of the measures of two angles is 180°, they are called **supplementary angles**. In the diagram below, $\angle LMN$ is a straight angle. If $m\angle LMP$ = 62°, what is $m\angle PMN$? Show



3. Now consider the diagram below, which shows and intersecting at E. If x = 23°, find $m\angle AEC$, $m\angle DEB$, and $m\angle CEB$. Show all work.



4. Based on your work in part (c), which angle has the same measure as $\angle AED$?

5. When two lines intersect, the angles that lie on opposite sides of the intersection point are called **vertical angles**. For example, in the diagram above, $\angle AED$ and $\angle CEB$ are vertical angles. Find another pair of vertical angles in the diagram.

- **2-3.** ANGLE RELATIONSHIPS **CW:2-1to2-4** **D**
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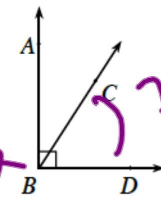
Two angles whose measures have a sum of 90° are called **complementary angles**. Since ∠*ABD* is a right angle in the diagram below, angles ∠*ABC* and ∠*CBD* are complementary. If *m*∠*CBD* = 76°, what is *m*∠*ABC*? Show how you got your answer.

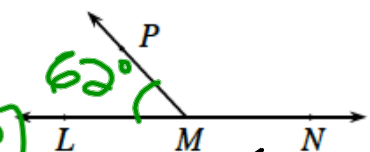
$m\measuredangle ABC + m\measuredangle CBD = 90°$
$m\measuredangle ABC + (76°) = 90°$
$\quad -76° \qquad -76°$
$m\measuredangle ABC = 90° - 76° = \boxed{14°}$



2\.

Another special angle is 180°. If the sum of the measures of two angles is 180°, they are called **supplementary angles**. In the diagram below, ∠*LMN* is a straight angle. If *m*∠*LMP* = 62°, what is *m*∠*PMN*?

$m\measuredangle LMP + m\measuredangle PMN = 180°$
$(62°) + m\measuredangle PMN = 180°$
$-62° \qquad -62°$
$m\measuredangle PMN = 180° - 62° = \boxed{118°}$



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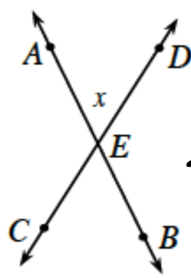
Now consider the diagram below, which shows and intersecting at *E*. If *x* = 23°, find *m*∠*AEC*, *m*∠*DEB*, and *m*∠*CEB*. Show all work.



4\.

Based on your work in part (c), which angle has the same measure as ∠*AED*?

5\.

When two lines intersect, the angles that lie on opposite sides of the intersection point are called **vertical angles**. For example, in the diagram above, ∠*AED* and ∠*CEB* are vertical angles. Find another pair of vertical angles in the diagram.

Answers

D

CW:2-1to2-4

2-3. ANGLE RELATIONSHIPS When you know two angles have a certain relationship, learning something about one of them tells you something about the other. Certain angle relationships come up often enough in geometry that they are given special names.

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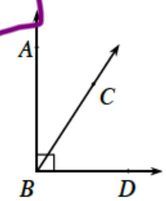


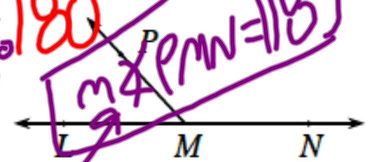
COMP $m\measuredangle ABC + m\measuredangle CBD = 90°$

$m\measuredangle ABC + (76°) = 90°$

$-76° \quad -76°$

$\boxed{m\measuredangle ABC = 14°}$

b. Another special angle is 180°. If the sum of the measures of two angles is 180°, they are called **supplementary angles**. In the diagram below, $\angle LMN$ is a straight angle. If $m\angle LMP = 62°$, what is $m\angle PMN$?



SUPP $m\measuredangle LMP + m\measuredangle PMN = 180°$

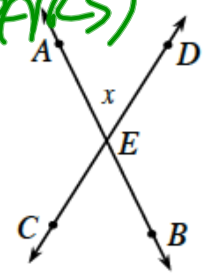
$(62°) + m\measuredangle PMN = 180°$

$-62° \quad -62°$

$\boxed{m\measuredangle PMN = 118°}$

c. Now consider the diagram below, which shows and intersecting at E. If $x = 23°$, find $m\angle AEC$, $m\angle DEB$, and $m\angle CEB$. Show all work.

SUPP (STRAIGHT $\measuredangle$ PAIRS)



(1) $m\measuredangle AEC + m\measuredangle AED = 180°$ ...

(2) $m\measuredangle AED + m\measuredangle DEB = 180°$ ...

(3) $m\measuredangle DEB + m\measuredangle CEB = 180°$ ...

1.

Based on your work in part (c), which angle has the same measure as $\angle AED$?

angle CEB

2. When two lines intersect, the angles that lie on opposite sides of the intersection point are called **vertical angles**. For example, in the diagram above, $\angle AED$ and $\angle CEB$ are vertical angles. Find another pair of vertical angles in the diagram.

angles AEC & BED

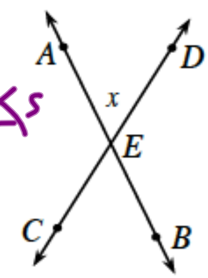
CW:2-1to2-4

2-4. Travis noticed that the vertical angles in parts (c) and (d) of problem 2-3 have equal measure and wondered if other pairs of vertical angles also have equal measure.

1. Based on the diagram at the right, find $m\angle CEB$ if $x = 54°$. Show all work.

$\angle AED$ & $\angle BEC$ ARE VERTICAL $\angle$s

$\angle AEC$ & $\angle BED$ "   "   "

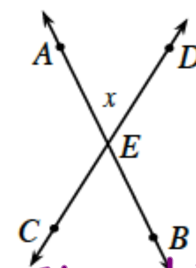


2. Based on your observations, write a **conjecture** (a statement based on an educated guess that is unproven). Start with, "*Vertical angles …*"

CW:2-1to2-4 **Answers**

2-4. Travis noticed that the vertical angles in parts (c) and (d) of problem 2-3 have equal measure and wondered if other pairs of vertical angles also have equal measure.

a. Based on the diagram at the right, find $m\angle CEB$ if $x = 54°$. Show all work.



$m\angle AED + m\angle DEB = 180$ [supp] ... -> $m\angle DEB = 126°$

Same reasoning yields $m\angle CEB = 54°$

$m\measuredangle AEC + m\measuredangle AED = 180°$

$m\measuredangle AEC + 54° = 180°$

$-54° \quad -54°$

$m\measuredangle AEC = 126°$

$m\measuredangle AEC + m\measuredangle CEB = 180$

$126° + m\measuredangle CEB = 180°$

$-126° \quad -126°$

$m\measuredangle CEB = 54°$

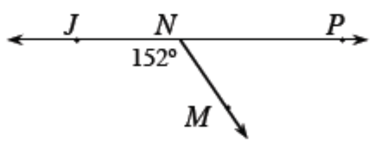
b. Based on your observations, write a **conjecture** (a statement based on an educated guess that is unproven). Start with, "*Vertical angles …*"

Vertical angles have equal measure.

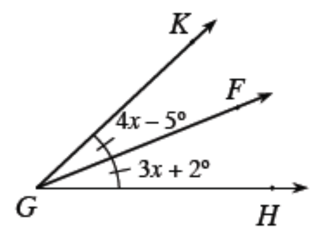
January 04, 2018

2-5. In the problems below, you will use geometric relationships to find angle measures. Start by finding a special relationship between some of the sides or angles, and use that relationship to write an equation. Solve the equation for the variable, then use that variable value to answer the original question.

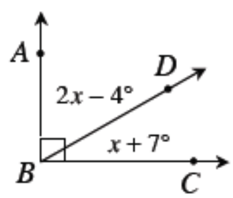
a. Find $m\angle MNP$.



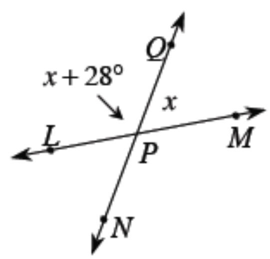
b. Find $m\angle FGH$.



c. Find $m\angle DBC$.



d. Find $m\angle LPQ$ and $m\angle LPN$.



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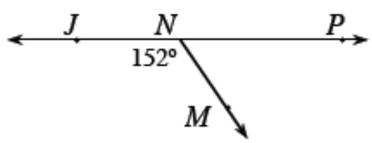

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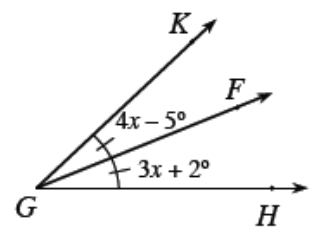

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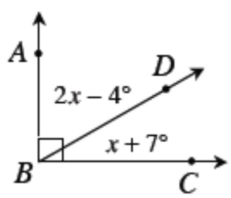

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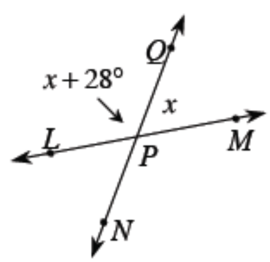


LEARNING LOG 2-7

Describe each of the angle relationships you learned about today in an entry in your Learning Log. Include a diagram, a description of the angles, and what you know about the relationship. For example, are the angles always equal? Do they have a special sum?

Vertical Angles:

Complementary angles:

Supplementary Angles:

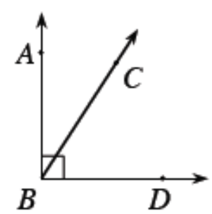
METHODS AND MEANINGS

MATH NOTES

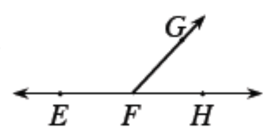
CPM pg 83

Angle Relationships

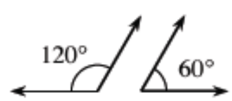
If two angles have measures that add up to 90°, they are called **complementary angles**. For example, in the diagram at right, $\angle ABC$ and $\angle CBD$ are complementary because together they form a right angle.



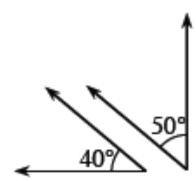
If two angles have measures that add up to 180°, they are called **supplementary angles**. For example, in the diagram at right, $\angle EFG$ and $\angle GFH$ are supplementary because together they form a straight angle.



Two angles do not have to share a vertex to be complementary or supplementary. The first pair of angles at right are supplementary; the second pair of angles are complementary.



Supplementary



Complementary

HW:

- 2-5, 2-8 to 2-12;
- LL 2-7 Angle Relationships on INB p52;
- MN Angle Relationships (p83) on INB p53

VERT.
COMP.
SUPP.

Review & Preview

- **2-5.** In the problems below, you will use geometric relationships to find angle measures. Start by finding a special relationship between some of the sides or angles, and use that relationship to write an equation. Solve the equation for the variable, then use that variable value to answer the original question (Images not included here, see your book for complete problem)

- **2-8.** Find the area of each rectangle below.

- **2-9.** Mei puts the shapes below into a bucket and asks Brian to pick one out.

1. What is the probability that he pulls out a quadrilateral with parallel sides?
2. What is the probability that he pulls out a shape with rotation symmetry?

- **2-10.** Camille loves guessing games. She is going to tell you a fact about her shape to see if you can guess what it is.

1. "My triangle has only one line of symmetry. What is it?"
2. "My triangle has three lines of symmetry. What is it?"
3. "My quadrilateral has no lines of symmetry but it does have rotation symmetry. What is it?"

- **2-11.** Jerry has an idea. Since he knows that an isosceles trapezoid has reflection symmetry, he reasons, "That means that it must have two pairs of angles have equal measure." He marks this relationship on his diagram below.

Copy the shapes below onto your paper. Similarly mark which angles must have equal measure due to reflection symmetry.

- **2-12.** Larry saw Javon's incomplete Venn diagram below, and he wants to finish it. However, he does not know the condition that each circle represents. Find a possible label for each circle, and place two more shapes into the diagram. Help (Html5)⇔Help (Java)

2-8. See below.

a. 33 sq. cm

b. $33x$ sq. units

c. $33x^2 - 50x + 8$ sq. units

2-9. See below.

a. $\frac{1}{2}$

b. $\frac{2}{6}$, parallelogram and square

c. $50t - 15t2$

d. $-32w + 24kw - 4wy$

2-10. See below.

a. Isosceles triangle

b. Equilateral triangle

c. Parallelogram

2-12.

Answers vary. The left circle could be "equilateral", and the right could be "quadrilateral". Assuming this, you could add an equilateral hexagon to the left, a rhombus to the intersection, and a rectangle to the right circle.

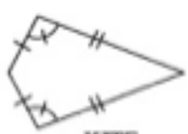
2-5. a. $180° - 152° = 28°$;

b. $4x - 5° = 3x + 2°$, $x = 7°$, $m\angle FGH = 23°$;

c. $2x - 4° + x + 7° = 90°$, $x = 29°$, $m\angle DBC = 36°$;

d. $x + 28° + x = 180°$, $x = 76°$, $m\angle LPQ = 104°$ and $m\angle LPN = 76°$

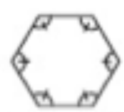
2-11. See answers below.

a. 

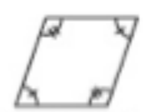
KITE

b. 

ISOSCELES TRIANGLE

c. 

REGULAR HEXAGON

d. 

RHOMBUS