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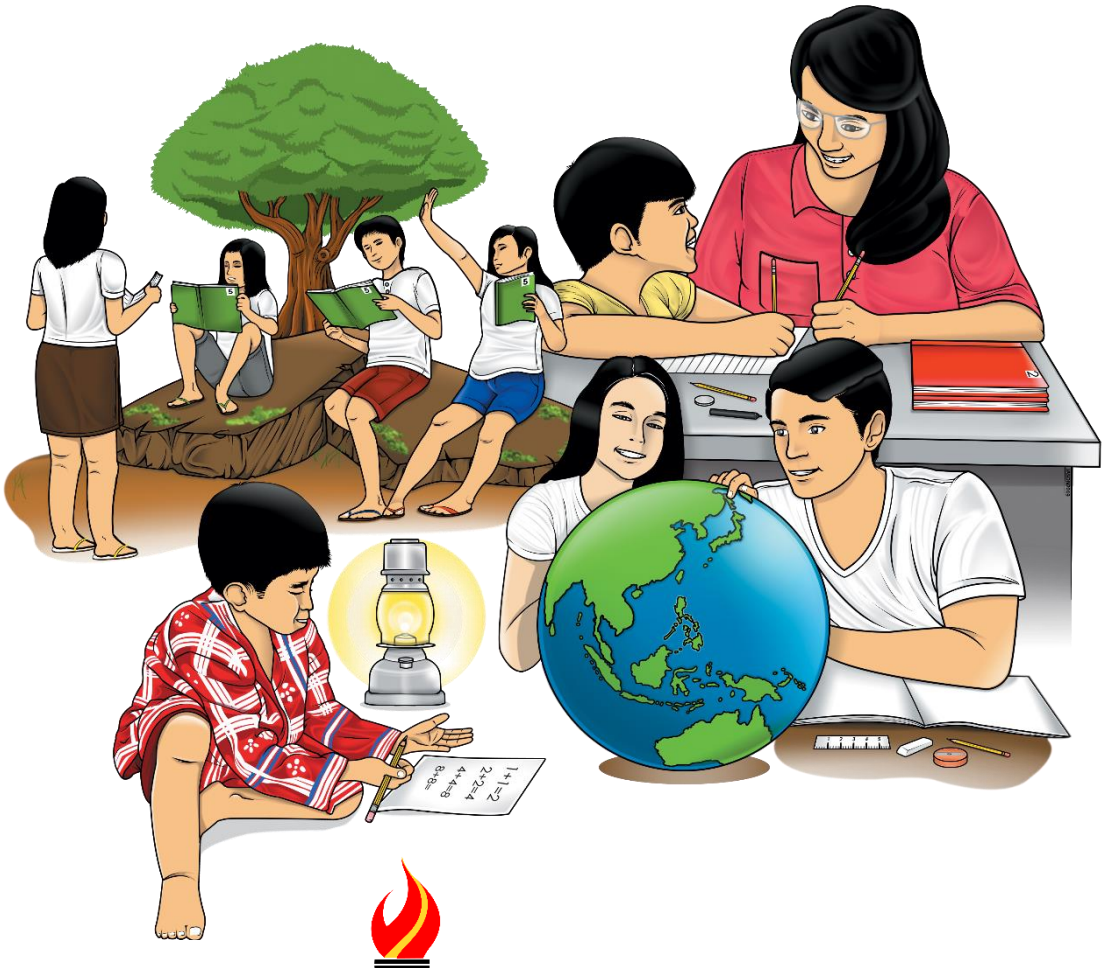
Mathematics

Quarter 3 – Module 2:
Angles



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Mathematics

Quarter 3 – Module 2:
Angles

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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

Thank you.

What I Need to Know

This module was designed and written with you in mind. It is here to help you learn about Angles. The scope of this module suited to different learning situations. The language used recognizes the diverse vocabulary level of students. The lessons are arranged to follow the standard sequence of the course. But the order in which you study them can be rearranged to correspond with the textbook you are now using.

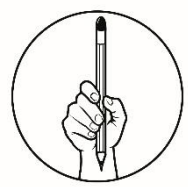
This module is comprised of only one lesson:

- Lesson – Angles

After going through this module, you are expected to:

1. classify the different kinds of angles; and

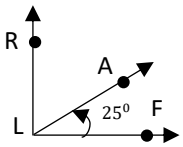
2. derive relationships of geometric figures using measurements and by inductive reasoning; supplementary angles, complementary angles, congruent angles, vertical angles, adjacent angles, linear pairs, perpendicular lines, and parallel lines.



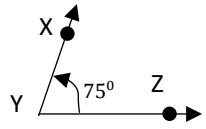
What I Know

Choose the letter of the best answer. Write the chosen letter on a separate sheet of paper.

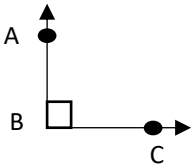
1. Which of the following statements is TRUE?
   A. An angle is formed by two noncollinear rays.
   B. Two points determine an angle.
   C. An angle divides a plane into two distinct parts.
   D. Two distinct angles cannot share an interior point.
2. What is the sum of the measures of supplementary angles?
   A. 45^0
   B. 50^0
   C. 90^0
   D. 180^0
3. On the figures at the right, $\angle RLA$ and $\angle ALF$ are complementary angles. If $m\angle ALF = 25$, then what is the measure of $m\angle RLA$?
   A. 25
   B. 55
   C. 65
   D. 155



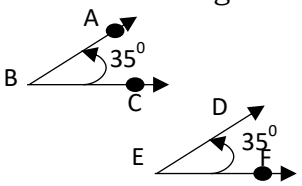
4. Which of the following pairs of angles has sum equal to 90^0?
   A. complementary angles
   B. linear pairs
   C. obtuse angles
   D. supplementary angles
5. Which of the following angles has measure less than 90^0 but greater than 0^0?
   A. acute angle
   B. obtuse angle
   C. right angle
   D. straight angle
6. In the figure at the right, $m\angle XYZ = 75^0$, what kind of angle does it form?
   A. acute angle
   B. obtuse angle
   C. right angle
   D. straight angle



7. All of the following are measures of an obtuse angle EXCEPT:
   A. 95^0
   B. 110^0
   C. 120^0
   D. 190^0
8. Given the figure at the right, if $\angle ABC = 90^0$, which of the following statements is TRUE?
   A. $\angle ABC$ is an acute angle.
   B. $\angle ABC$ is a right angle.
   C. $\angle ABC$ is an obtuse angle.
   D. $\angle ABC$ has no known classification.

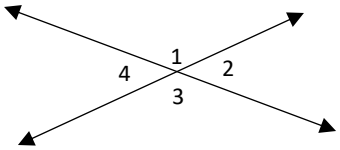


9. Which of the following is a measure of an acute angle?
   A. 170^0
   B. 150^0
   C. 90^0
   D. 80^0
10. If $m\angle MAT = 135^0$ and $m\angle HAE = 45^0$, then which of the following could describe the two angles?
   A. complementary angles
   B. vertical angles
   C. supplementary angles
   D. forms a right angle
11. Given the figures at the right, what can you conclude about the two angles?
   A. linear pairs
   B. congruent angles
   C. vertical angles
   D. perpendicular to each other



12. Which of the following is true about parallel lines?
   A. coplanar lines that do not intersect no matter how far they are extended
   B. two lines with a common point
   C. three or more lines that have a common point
   D. straight lines that do not intersect and are not on the same plane

For items No. 13 – 14, consider the figure below:



13. Which of the following are vertical angles?
   A. ∠1 and ∠2
   B. ∠1 and ∠4
   C. ∠2 and ∠4
   D. ∠2 and ∠3
14. Which of the following form a linear pair?
   A. ∠1 and ∠2
   B. ∠1 and ∠3
   C. ∠2 and ∠4
   D. None of these.
15. Which of the following describes the perpendicular lines?
   A. lines that intersect to form a right angle
   B. lines that meet at a common point
   C. lines that do not meet
   D. lines that meet to form complementary angles

Very Good! You did a good job. You're now ready for the next set of activities.

Lesson 1

Angles

You are now on the next module! Let's now study about angles. Angles can be found everywhere. Buildings, establishments, satellite dishes, billboards, and many other objects forming angles. Of course, you also have clocks in your homes, right? Notice the figure formed by the two hands of the clock. They are clearly examples of angles. These sounds interesting. Hello, angles!

What's In

The concept of rays is useful for us to effectively grasp the lesson in this module. Let us recall some lessons we had on rays.

A ***ray*** is a part of a line with an endpoint and extends endlessly in one direction. It is named by its endpoint and any other point on it.

Figure 1

Figure 1 shows an example of a ray. Ray *AB* has endpoint *A* and goes indefinitely toward the direction of point *B*. A ray with an endpoint *A* and another point *B* on one side of endpoint *A* is named $\overrightarrow{AB}$ (read as "ray *AB*").

Note that ray $\overrightarrow{AB}$ cannot be called $\overrightarrow{BA}$. Ray *BA* has an endpoint *B*, as illustrated in Figure 3 below.

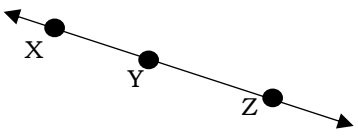
Figure 2

Figure 2 The given ray is called $\overrightarrow{BA}$.

Let's see if you can still remember the concepts about rays. Try the following activity!

Activity 1: Name Me!

Given the figure at the left, name four(4) different rays you can create from it.



1. _____
2. _____
3. _____
4. _____

Great! So easy, right? Let's go on!

What's New

The measure of an angle indicates how wide the opening is between its two sides. A *protractor* is used to find the measure of an angle, just like a ruler is used to find the length of a segment.

To find the measure of an angle using a protractor, place the center of the protractor over the vertex of an angle. Then align the mark labeled 0 with one side of the angle and read the scale where the other side of the angle falls. The unit of measurement used for angles is called *degree*, denoted by the symbol ^{0}.

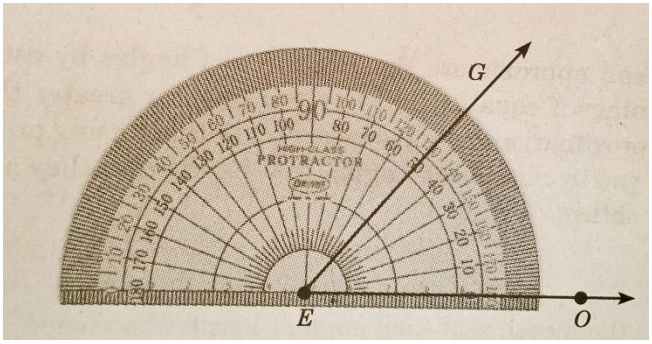


Fig.3

A protractor usually has outer and inner degree scales. You may use any of these scales depending on the positions of the angle. Using the inner scale of the protractor shown in the figure above, the measure of $\angle GEO$ is equal to 50 degrees, written as

$$m\angle GEO = 50^0$$

Now, let us try to draw $\angle LAB$ so that $m\angle LAB = 80^0$. Use a protractor.

Solution:

- Draw $\overrightarrow{AB}$
- Place the center of protractor at A with $\overrightarrow{AB}$ coinciding with the line where the 0^0 mark is.
- Mark L at 80^0
- Draw $\overrightarrow{AL}$

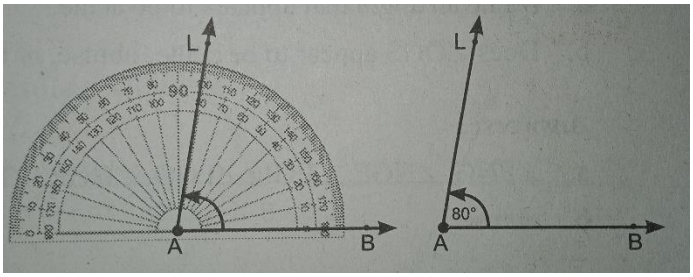
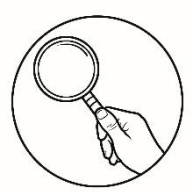


Fig. 4



What is It

Definition: An angle is formed by two noncollinear rays with a common endpoint.

BASIC CONCEPTS ON ANGLES

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

The symbol for an angle is ∠**.** An angle can be named in three ways, that is, by using (1) the number assigned to the angle, (2) its vertex, or (3) its vertex and two other points, one from each side of the angle. The vertex of the angle below is *B* and its sides are $\overrightarrow{BA}$ and $\overrightarrow{BC}$.

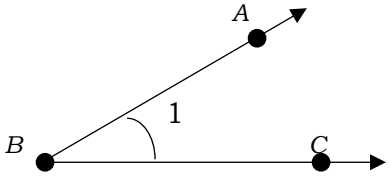
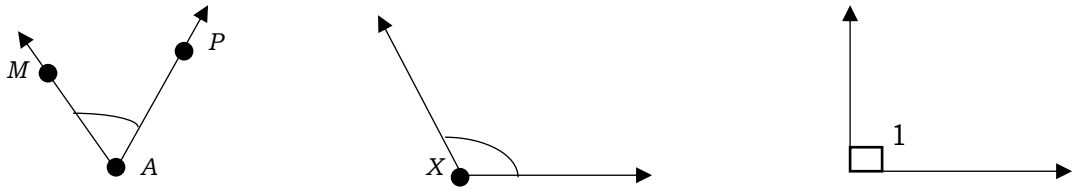


Fig. 5

The angle above can be name as angle 1 ($\angle 1$), angle *B* ($\angle B$), angle *ABC* ($\angle ABC$), or angle *CBA* ($\angle CBA$).

Other examples of angles are shown below.



(a) *(b)* *(c)*

Fig. 6

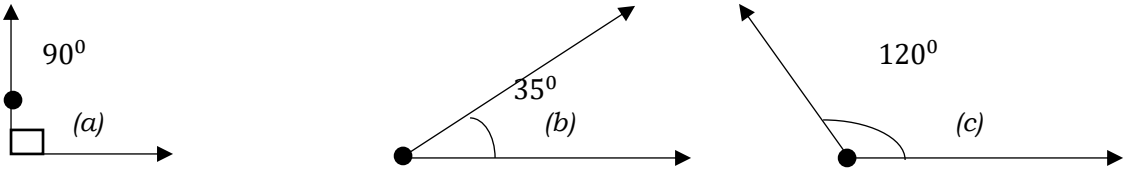
The angles are *(a)* $\angle MAP$ or $\angle PAM$, *(b)* $\angle X$, and *(c)* $\angle 1$.

KINDS OF ANGLES

Angles can be classified according to their measures. They can be a right angle, an acute angle, or an obtuse angle.

Definition: A right angle *is an angle that measures exactly* 90^0. *An* acute angle *is an angle that measures less than* 90^0. *An* obtuse angle *is an angle that measures more than* 90^0 *but less than* 180^0

Fig. 7



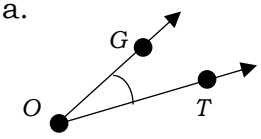
Based on the figures above, some angles can be classified as *(a)* a right angle, *(b)* an acute angle, or *(c)* an obtuse angle.

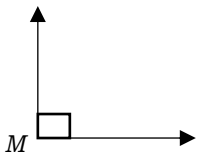
Angle A is a right angle since $m\angle A = 90^0$. Angle C is an acute angle since $m\angle C < 90$, while angle D is an obtuse angle since $90^0 < m\angle D < 180^0$.

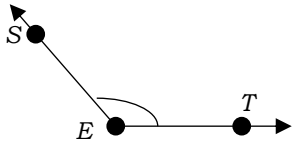
You can approximate the measures of angles by estimating their openings if equal to 90^0, less than 90^0, or greater than 90^0. These approximations of angle measures without using protractors will help you in classifying angles whether they are right, acute, or obtuse.

Example 1

Estimate the measure of each angle. Classify the angle.

a. 

b. 

c. 

Solution

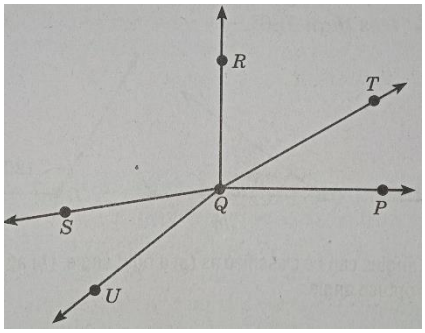
You can use approximations to determine if the measure of each angle is less than 90^0, equal to 90^0, or greater than 90^0.

a. $m\angle GOT < 90^0$; acute angle
b. $m\angle M = 90^0$; right angle
c. $m\angle SET > 90^0$; obtuse angle

Example 2

Refer to the given figure. Measure and classify each indicated angle.

a. $\angle PQR$
b. $\angle PQT$
c. $\angle RQS$



Solution

a. $m\angle PQR = 90^0$; right angle
b. $m\angle PQT = 30^0$; acute angle
c. $m\angle RQS = 100^0$; obtuse angle

Refer again to the figure in example 2. Use your protractor to measure $\angle UQS$. Angle UQS measures 30^0. Thus, $m\angle PQT = m\angle UQS = 30$. Angles PQT and UQS are *congruent angles,* denoted by $\angle PQT \cong \angle UQS$, which is read as "angle PQT is congruent to angle UQS."

Definition: Congruent angles *are angles that have the same measure.*

Use identical markings to show congruent angles in a figure. Refer to figure 9. If $\overrightarrow{BM}$ is the angle bisector of $\angle ABC$ then $\angle ABM \cong \angle MBC$. Also, if $\angle ABM \cong \angle MBC$ then $\overrightarrow{BM}$ divides $\angle ABC$ into two congruent angles. Thus, $\overrightarrow{BM}$ is the *angle bisector of* $\angle ABC$.

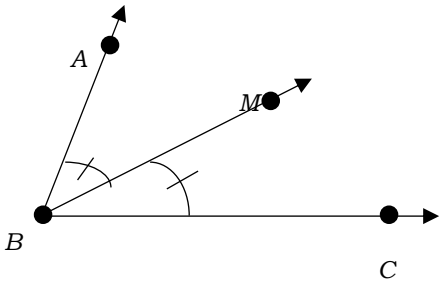


Fig. 8

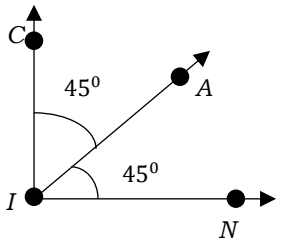
On the figure above, the identical marks means that $\angle ABM \cong \angle MBC$, hence, $\overrightarrow{BM}$ bisects $\angle ABC$.

Definition: *An* angle bisector *divides an angle into two congruent angles.*
Note: Every angle has *exactly one* angle bisector.

Example 3

Name each angle bisector and all congruent angles in the figure.

1.



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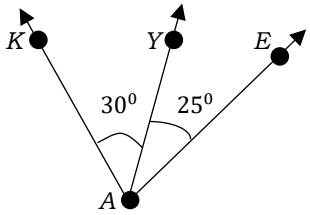

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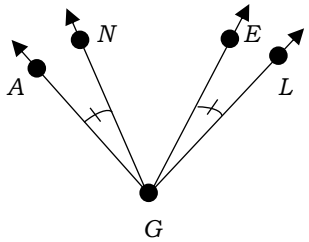


Solution

1. Since $m\angle CIA = m\angle AIN = 45^0$, therefore, $\angle CIA \cong \angle AIN$. Hence, $\overrightarrow{IA}$ is an angle bisector of $\angle CIN$.
2. Ray AY is *not* an angle bisector of $\angle KAE$ since $m\angle KAY \neq m\angle YAE$.
3. Angle AGN is congruent to angle LEG. Rays GN and GE are *not* angle bisectors of $\angle AGL$ since these two different rays do not divide $\angle AGL$ into two angles.

ANGLE PAIRS

Geometric relationships exist between two angles. These relationships can be used as bases for classifying angle pairs. Angle pairs include adjacent angles, complementary angles, supplementary angles, linear pairs, and vertical angles.

Adjacent Angles

Look at $\angle ABD$ and $\angle DBC$. What do they have in common?

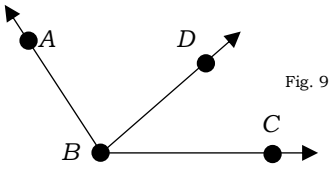


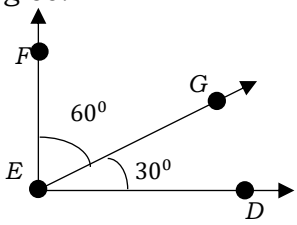
Fig. 9

Angles *ABD* and *DBC* are adjacent angles with *B* as their common vertex and ray *BD* as their common side.

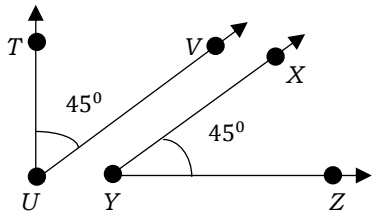
> Definition: Adjacent angles *are angles on the same plane that have a common side and a common vertex but no common interior points.*

Complementary Angles

Look at $\angle FEG$ and $\angle GED$. What is the sum of their measures? Compare this sum to that of $\angle TUV$ and $\angle XYZ$. What can you say about the sum of two pairs of angles?



(a)



(b)

Fig. 10

On the figures above, Angles *FEG* and *GED* in *(a)* are adjacent complementary angles. Angles *TUV* and *XYZ* in *(b)* are nonadjacent complementary angles.

Since $m\angle FEG + m\angle GED = 60^0 + 30^0 = 90^0$, then $\angle FEG$ and $\angle GED$ are complementary angles.

Angle *GED* is the *complement* of $\angle FEG$. Also, $\angle FEG$ is the *complement* of $\angle GED$. Angles *GED* and *FEG* have a common side $\overrightarrow{EG}$, that is, they are also adjacent angles. Therefore, $\angle GED$ and $\angle FEG$ are adjacent complementary angles.

On the other hand, in figure 10(b),

$$m\angle TUV + m\angle XYZ = 45^0 + 45^0 = 90^0$$

Hence, $\angle TUV$ and $\angle XYZ$ are complementary. They have no common side so they are nonadjacent complementary angles.

> Definition: Complementary angles *are two angles whose measures have a sum of* 90^0.

Example 1

Find the measure of the complement of an angle whose measure is 55^0.

Solution

Let x = the measure of the complement of an angle. Hence,

$x + 55^0 = 90^0$

$x = 90^0 - 55^0$ By SPE: Subtract 55 from both sides.

$x = 35^0$.

Check your answer.

$$35^0 + 55^0 = 90^0 \qquad \text{True}$$

Hence, the measure of the complement of a 55^0 angle is a 35^0 angle.

Example 2

Find the measures of the complementary angle of a 12^0 angle less than twice the other.

Solution

Let x = the measure of the first angle,
$2x - 12$ = the measure of the second angle.

Since the two angles are complementary.

$$x + (2x - 12) = 90$$
$$3x - 12 = 90 \qquad \text{Combine similar terms.}$$
$$3x = 90 + 12 \qquad \text{By APE: Add 12 to both sides.}$$
$$3x = 102$$
$$\frac{3x}{3} = \frac{102}{3} \qquad \text{By DPE: Divide both sides by 3.}$$
$$x = 34.$$

It follows that the second angle measures

$$2x - 12 = 2(34) - 12 = 68 - 12 = 56.$$

Thus, the two complementary angles measure 34^0 and 56^0, respectively.

Supplementary Angles

Look at the following angles pairs: $\angle MNO$ and $\angle ONP$, and $\angle ABC$ and $\angle RST$. What is the sum of the measures of each angle pair?

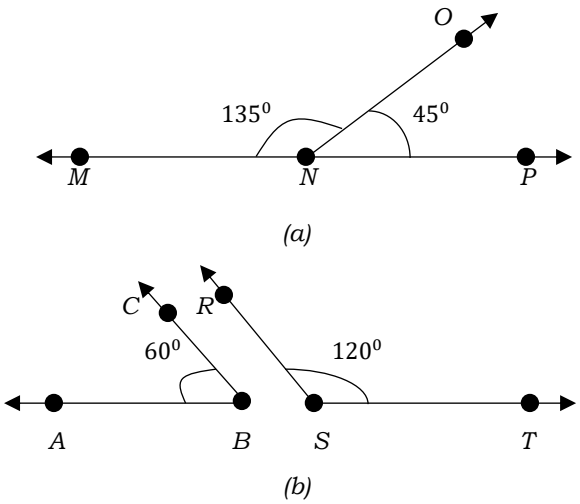


Fig.11

In Figure 11(a), Angles *MNO* and *ONP* are adjacent supplementary angles, while in (b), Angles *ABC* and *RST* are nonadjacent supplementary angles.

The sum of the measures of $\angle MNO$ and $\angle ONP$ is

$$m\angle MNO + m\angle ONP = 135^0 + 45^0 = 180^0.$$

Hence, $\angle MNO$ and $\angle ONP$ are supplementary angles. These two angles are

supplements of each other. Notice also that these angles are adjacent (since they have a common side $\overrightarrow{NO}$) and, at the same time, supplementary.

On the other hand, in figure 11(b),

$$m\angle ABC + m\angle RST = 60 + 120 = 180.$$

Hence, $\angle ABC$ and $\angle RST$ are also supplementary. Notice also that these two angles are supplementary but not adjacent.

> Definition: Supplementary angles *are two angles whose measures have a sum of* 180^0.

Example

The measure of the supplement of an angle is 25^0 more than 4 times the measure of the angle. Find the measure of each angle.

Solution

Let x = the measure of an angle,
$180 - x$ = the measure of its supplement.

Then solve for x in the equation $180 - x = 4x + 25$.

$180 - x = 4x + 25$
$-x - 4x = 25 - 180$ By SPE: Subtract $4x$ and 180 from both sides.
$-5x = -155$
$\frac{-5x}{5} = \frac{-155}{-5}$ DPE: Divide both sides by -5.
$x = 31$

Then substitute 31 for x in $180 - x$ to get the measure of the supplement of the angle.

$$180 - x = 180 - 31 = 149$$

Check your answer.

$$31 + 149 = 180 \qquad \text{True}$$

Therefore, the angle measures 31^0 and its supplement measures 149^0.

Linear Pairs

Look at $\angle VXY$ and $\angle XYZ$. How will you classify this angle pair?

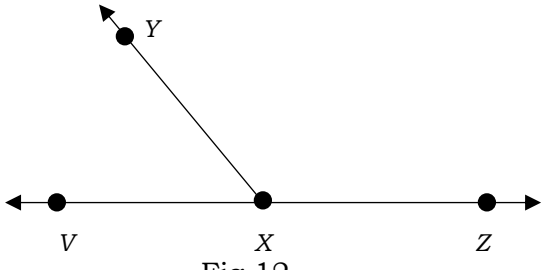


Fig.12

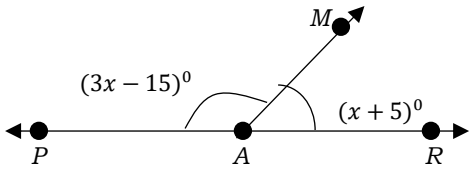
In the figures above, Angles *VXY* and *YXZ* are adjacent and supplementary angles with a common side $\overrightarrow{XY}$.

You call $\angle VXY$ and $\angle YXZ$ a *linear pair.*

> Definition: A linear pair *consists of two adjacent angles whose noncommon sides are opposite rays.*

Example

Find the measure of each angle in the linear pair.



Solution

Since $\angle PAM$ and $\angle MAR$ form a linear pair, they are supplementary. Thus,

$$(3x-15)+(x+5)=180$$

$4x-10=180$ Combine similar terms.

$4x=180+10$ By APE: Add 10 to both sides.

$4x=190$

$\frac{4x}{4}=\frac{190}{47.5}$ By DPE: Divide both sides by 4.

Substituting 47.4 for x, the two angles measure

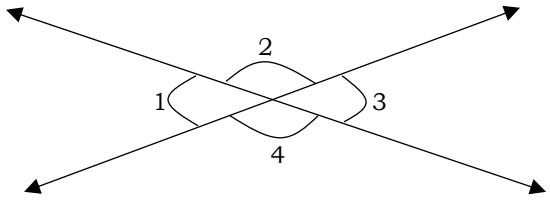
$x+5=47.5+5$ and $3x-15=3(47.5)-15$

$x=52.5$ $x=127.5$

Vertical Angles

When two lines intersect, they form a pair of nonadjacent angles called *vertical angles.*

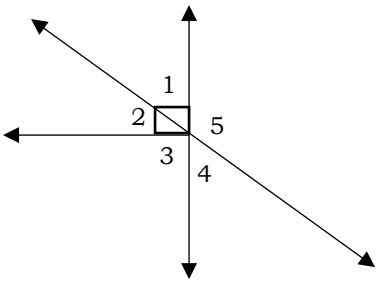
> Definition: Vertical angles *are two nonadjacent angles formed by two intersecting lines.*



Example

In the figure below, name each indicated angle pair.

1. complementary angles
2. supplementary angles
3. vertical angles
4. adjacent angles
5. Linear pairs



Solution

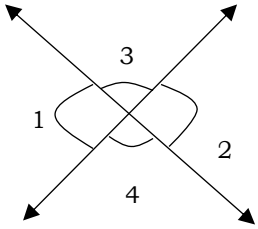
1. ∠1 and ∠2
2. ∠4 and ∠5
3. ∠1 and ∠4

4. ∠1 and ∠2, ∠1 and ∠5, ∠2 and ∠3, ∠3 and ∠4, and ∠4 and ∠5
5. ∠4 and ∠5

Vertical angles are congruent.

Example

Find the measures of all vertical angles in the figure where $m\angle 1 = 2x + 15$ and $m\angle 2 = 85 - 5x$.



Solution

Since ∠1 and ∠2 are vertical angles, ∠1 ≅ ∠2. Hence,

$m\angle 1 = m\angle 2$	Definition of congruent angles
$2x + 15 = 85 - 5x$	By substitution
$2x + 5x + 15 = 85$	By APE: Add 5x to both sides.
$7x + 15 = 85$	Combine like terms.
$7x = 85 - 15$	By SPE: Subtract 15 from both sides.
$7x = 70$	
$\frac{7x}{7} = 70$	By DPE: Divide both sides by 7.
$x = 10.$	

By substituting 10 for x, you get the measures of ∠1 and ∠2.

$m\angle 1 = 2x + 15 = 2(10) + 15 = 20 + 15 = 35$
$m\angle 2 = 85 - 5x = 85 = 85 - 5(10) = 85 - 50 = 35$

Since ∠1 and ∠3 form a linear pair, then ∠1 and ∠3 are supplementary angles. Thus,

$m\angle 1 + m\angle 3 = 180$	
$35 + m\angle 3 = 180$	By Substitution
$m\angle 3 = 180 - 35$	By SPE: Subtract 35 from both sides.
$m\angle 3 = 145.$	

Since ∠3 and ∠4 are vertical angles, ∠3 ≅ ∠4. Thus,

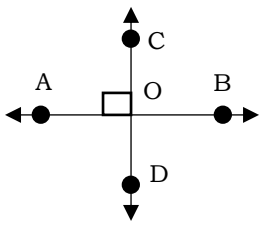
$m\angle 3 = m\angle 4$	Definition of congruent angles
$145 = m\angle 4$	By substitution
$m\angle 4 = 145$	By symmetric property of equality

Hence,

$m\angle 1 = m\angle 2 = 35$ and $m\angle 3 = m\angle 4 = 145$.

Perpendicular Lines

When two lines intersect to form right angles, the two lines are said to be *perpendicular* to each other.



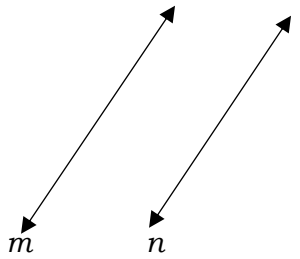
In the accompanying figure, $\overleftrightarrow{AB}$ and $\overleftrightarrow{CD}$ intersect at point O to form right angles. We say that AB is perpendicular to CD. In symbols, we write $\overleftrightarrow{AB} \perp \overleftrightarrow{CD}$.

Since $\angle AOC$ and $\angle BOC$ form a linear pair, they are supplementary. That is

$$m\angle AOC + m\angle BOC = 180^0$$

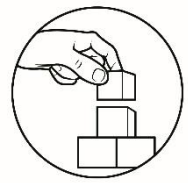
Since $m\angle AOC = 90^0$, therefore, $m\angle BOC = 90^0$. In the same manner, $m\angle AOD = 90^0$ and $m\angle BOD = 90^0$. Thus, perpendicular lines form four right angles.

Parallel Lines



Parallel lines are lines that do not intersect no matter how far they are extended. Lines m and n do not intersect, and are parallel. You write this as $m \parallel n$. The symbol ∥ is read as "is parallel to".

Definition: Parallel lines *are coplanar lines that do not intersect.*



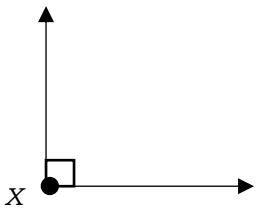
What's More

Let us now try use the knowledge we have gained from the concepts presented earlier in answering series of activities below. Write your answer on a separate sheet of paper.

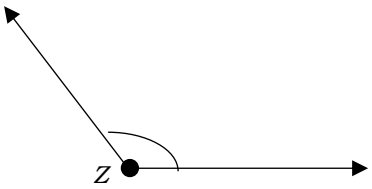
A. Determine if each statement is ***TRUE*** or ***FALSE***.
1. An angle is formed by two noncollinear rays.
2. All right angles are congruent.
3. All acute angles are congruent.
4. Two distinct angles cannot share an interior point.
5. Point O is the vertex of $\angle GEO$.
6. All congruent angles are right angles.
7. An obtuse angle measures less than 90^0.
8. An angle divides a plane into two distinct parts.
9. The sum of the measures of two acute angles is always greater than 90^0.
10. The sum of the measures of two obtuse angles is greater than 180^0.

B. Estimate the measure of each angle. Classify the angles whether ***RIGHT, ACUTE*** or ***OBTUSE ANGLE***.

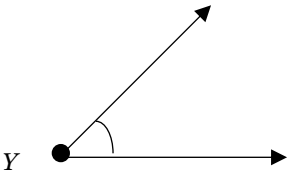
1.



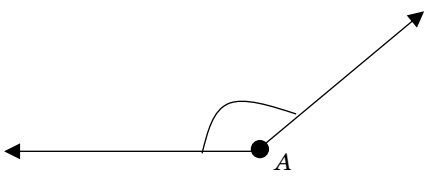
3.



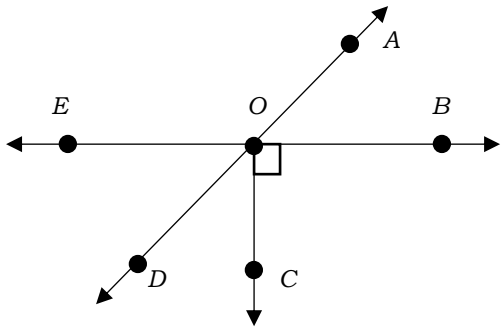
2.



4.

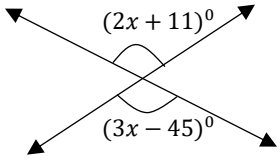
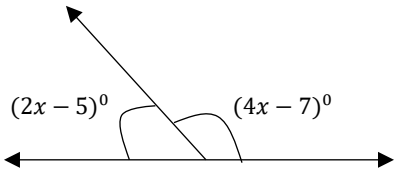
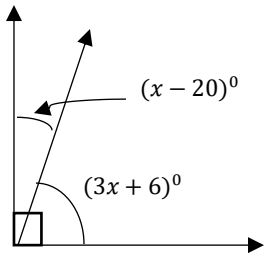


C. Identify whether the following pairs of angles are **ADJACENT ANGLES, LINEAR PAIRS, COMPLEMENTARY ANGLES, SUPPLEMENTARY ANGLES** or **VERTICAL ANGLES.** Refer to the given figure. *(You may have one or more possible answers in each item.)*



1. $\angle DOE$ and $\angle EOA$ = _____
2. $\angle AOB$ and $\angle AOE$ = _____
3. $\angle EOD$ and $\angle DOC$ = _____
4. $\angle EOD$ and $\angle BOD$ = _____
5. $\angle DOE$ and $\angle BOA$ = _____

D. Find the value of x in each figure. Copy on a separate sheet of paper and complete the answer in the table.

1. 	Your Answer Here: $2x + 11 = 3x - 45$
2. 	Your Answer Here: $(2x - 5) + (4x - 7) = 180$
3. 	Your Answer Here: $(x - 20) + (3x + 6) = 90$

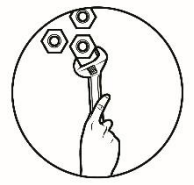
Good job! Get ready for another learning battle ahead!

What I Have Learned

Write **always, sometimes,** or **never** in each blank to complete each statement. Write your answer in a separate sheet of paper.

1. Angles complementary to the same angle or to congruent angles are _____ congruent.
2. Two right angles are _____ congruent.
3. Two congruent angles are _____ right.
4. Angles supplementary to the same angle or congruent angles are _____ congruent.
5. Two complementary angles _____ form a right angle.
6. Two angles that form a right angle are _____ complementary.
7. Two vertical angles are _____ nonadjacent.

Nice work! Now you're up for the next challenge of this lesson.



What I Can Do

Here is another activity that will let you apply what you have learned about angles.

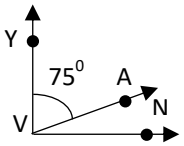
Solve each word problem.

1. What is the measure of the complement of an angle whose measure is 72^0?
2. Find the measure of the supplement of an angle whose measure is 72^0?
3. Two angles form a linear pair. If the measure of the first angle is twice that of the second angle, what is the measure of each angle?

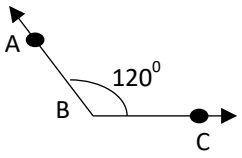
Assessment

For you to determine how much you've learned, please answer the questions by choosing the letter of the best answer.

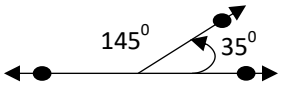
1. Which of the following statements is NOT TRUE?
   A. An angle is formed by two noncollinear rays.
   B. Two points determine an angle.
   C. An angle is a union of two rays..
   D. An angle can be a right angle if its measure is equal to 90^0.
2. If two angles form a linear pair, then they are supplementary. What is the sum of the measures of these two angles?
   A. 180^0
   B. 90^0
   C. 50^0
   D. 45^0
3. On the figures at the right, $\angle YVA$ and $\angle AVN$ are complementary angles. If $m\angle YVA = 25$, then what is the measure of $m\angle RLA$?
   A. 285^0
   B. 105^0
   C. 15^0
   D. 5^0



4. Which of the following pairs of angles whose sum of the measures is equal to 180^0?
   A. complementary angles
   B. acute angles
   C. obtuse angles
   D. supplementary angles
5. Which of the following angles has measure greater than 90^0 but lesser than 180^0?
   A. acute angle
   B. obtuse angle
   C. right angle
   D. straight angle
6. If an angle measures 90^0, what kind of angle does it form?
   A. acute angle
   B. obtuse angle
   C. right angle
   D. straight angle
7. All of the following are measures of an acute angle EXCEPT:
   A. 90^0
   B. 85^0
   C. 78^0
   D. 5^0
8. Given the figure at the right, if $m\angle ABC = 120^0$, which of the following statements is TRUE?
   A. $\angle ABC$ is an acute angle.
   B. $\angle ABC$ is a right angle.
   C. $\angle ABC$ is an obtuse angle.
   D. $\angle ABC$ has no known classification.

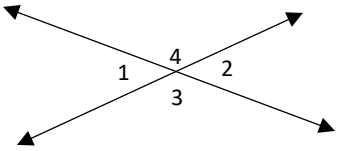


9. Which of the following is a measure of an obtuse angle?
   A. 35^0
   B. 65^0
   C. 90^0
   D. 160^0
10. If $m\angle MAT = 35^0$ and $m\angle HAE = 55^0$, then which of the following could describe the two angles?
   A. complementary angles
   B. vertical angles
   C. supplementary angles
   D. forms a right angle
11. Given the figures at the right, what can you conclude about the two angles?
   A. They are congruent.
   B. They form a linear pair.
   C. They form vertical angles.
   D. They are perpendicular to each other.



12. Which of the following is true about perpendicular lines?
   A. Perpendicular lines are lines are coplanar lines that do not intersect no matter how far they are extended.
   B. Perpendicular lines are two lines with a common point.
   C. Perpendicular lines are lines that intersect each other to form right angles.
   D. Perpendicular lines are straight lines that do not intersect and are not on the same plane.

For items No. 13 – 14, consider the figure below:



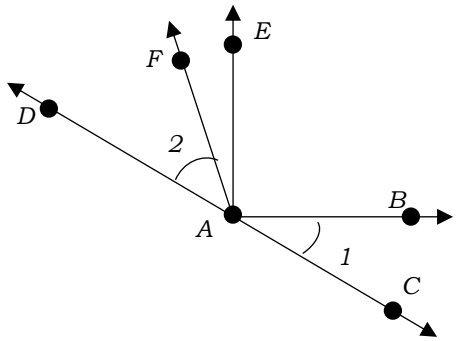
13. Which of the following are vertical angles?
   A. ∠1 and ∠2
   B. ∠1 and ∠4
   C. ∠2 and ∠4
   D. ∠2 and ∠3
14. Which of the following forms a linear pair?
   A. ∠1 and ∠2
   B. ∠1 and ∠3
   C. ∠3 and ∠4
   D. None of these.
15. Which of the following describes the parallel lines?
   A. intersect to form a right angle
   B. meet at a common point
   C. lines that do not meet
   D. lines that meet to form complementary angles

Good Job! You did well on this module! Keep going!

Additional Activities

This section includes supplementary activities related to operations involving polynomials.

Do as indicated. Refer to the given figure.



1. Give another name for ∠**1**.
2. Name all angles with $\overleftrightarrow{AF}$ as a side.
3. Determine how many acute angles there are with point *A* as their vertex. Name two of these acute angles.

Answer Key

What I Know

1. A	9. D
2. D	10. C
3. C	11. B
4. A	12. A
5. A	13. C
6. A	14. A
7. D	15. A
8. B	

What's In

Activity 1:

1. $\overrightarrow{YX}$
2. $\overrightarrow{ZX}$
3. $\overrightarrow{XZ}$
4. $\overrightarrow{YZ}$

What's More

A.

1. True
2. True
3. False
4. False
5. False
6. False
7. False
8. False
9. False
10. True

B.

1. Right angle
2. Acute angle
3. Obtuse angle
4. Obtuse angle

What's More

C.

1. Linear pair, adjacent angles, supplementary angles
2. Linear pair, adjacent angles, supplementary angles
3. Adjacent angles, complementary angles
4. Linear pair, adjacent angles, supplementary angles
5. Vertical angles

D.

1. $x = 56^0$
2. $x = 32^0$
3. $x = 26^0$

What I Have Learned

1. sometimes
2. always
3. sometimes
4. sometimes
5. always
6. always
7. always

What I Can Do

1. 18^0
2. 108^0
3. $60^0, 120^0$

Assessment

1. B
2. A
3. C
4. D
5. B
6. C
7. A
8. C
9. D
10. A
11. B
12. C
13. A
14. B
15. C

Additional Activities

1. $\angle BAC$ or $\angle CAB$
2. $\angle DAF$ or $\angle FAD, \angle FAE$ or $\angle EAF, \angle FAB$ or $\angle BA$ $\angle FAC$ or $\angle CAF$
3. 4; $\angle DAF$ or $\angle FAD$, $\angle FAE$ or $\angle EAF$, $\angle BAC$ or $\angle CAB$, $\angle DAE$ or $\angle EAD$

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