

Learning Strand 3
Mathematical and Problem Solving Skills
PERIMETER AND CIRCUMFERENCE

Accreditation and Equivalency (A&E) Program Module



Book Record

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To the Learner

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2. Use the following letters in recording the **condition** of the book before and after borrowing:

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C. used book in Fair Condition

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5. Do not leave it open or lying face down when not in use.
6. Do not use pencils, ballpens, or thick objects as bookmarks.
7. Do not force the book into a packed schoolbag.
8. Do not use it to cover your head when it is raining.
9. Do not sit on it.

Elementary

Learning Strand 3
Mathematical and Problem Solving Skills
PERIMETER AND CIRCUMFERENCE



Accreditation and Equivalency (A&E) Program Module



Learning Strand 3 – Elementary
Alternative Learning System
Perimeter and Circumference
First Edition, 2023

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Secretary: Sara Z. Duterte-Carpio

Undersecretary: Gina O. Gonong

Development Team of the Module

Writer:	Kay-Cee D. Enriquez
Reviewers:	Braian B. Mahinay, Eljun A. Calimpusan, Jake Yao
Illustrators:	Kay-Cee D. Enriquez Anna Katherine B. Doroja
Layout Artist:	Melody Zulaybar – De Castro
Management Team:	Bureau of Alternative Education (BAE) Bureau of Learning Resources (BLR) Regional Office NCR Schools Division of Manila

User's Guide

For the ALS Learner:

This module was designed to provide you with fun and meaningful opportunities for guided and independent learning at your own pace and time. You will be enabled to process the contents of the learning resource while being an active learner.

This module has the following parts and corresponding icons:



What Is This Module About?

This will give you an idea of the skills or competencies you are expected to learn in the module.



Let's See What You Already Know

This part includes an activity that aims to check what you already know about the lesson. If you get all the answers correct (100%), you may decide to skip



What Will You Learn from This Module?

This contains objective/s or the learning competencies in a lesson. This may include a brief rationale on what you will learn.



Let's Do This

This part gives instruction to the learner to perform the activity/ies as mentioned-above to ensure learning the competencies or the objectives.



Let's Study and Analyze

This section provides a brief discussion of the lesson. This aims to help you discover and understand new concepts and skills.



Let's Try This

This comprises activities for independent practice to solidify your understanding and skills of the topic. You may check the answers to the exercises using the Answer Key at the end of the module.



Let's See What You Have Learned

This section provides an activity that will help you transfer your new knowledge or skill in real-life situations or concerns.



Let's Remember and Review

This contains key concepts taken from all the lessons covered in every module.



Explore More

This is an activity in a form that increase the strength of the response and tends to induce repetitions of actions/learning.



What Have You Learned?

This is a task which aims to evaluate your level of mastery in achieving the given learning competency.



Answer Key

This contains answers to all activities in the module.

Glossary

This portion gives information about the meanings of the specialized words used in the module.

Reference

This is a list of all sources used in developing this module.

The following are some reminders in using this module:

1. Use the module with care. Do not put unnecessary mark/s on any part of the module. Use a separate sheet of paper in answering the exercises.
2. Don't forget to answer the Pre-assessment before moving on to the other activities included in the module.
3. Read the instruction carefully before doing each task.
4. Observe honesty and integrity in doing the tasks and checking your answers.
5. Finish the task at hand before proceeding to the next.
6. Return this module to your ALS Teacher/Instructional Manager/Learning Facilitator once you are through with it.

If you encounter any difficulty in answering the tasks in this module, do not hesitate to consult your ALS Teacher/Instructional Manager/Learning Facilitator. Always bear in mind that you are not alone.

We hope that through this material, you will experience meaningful learning and gain deep understanding of the relevant competencies. You can do it.

Contents

What Is This Module About?.....	1
Let's See What You Already Know.....	2
What Will You Learn From This Module?.....	3
Lesson 1	3
Let's Do This.....	3
Let's Study and Analyze.....	4
Let's Try This.....	8
Let's See What You Have Learned	8
Lesson 2	9
Let's Do This.....	9
Let's Study and Analyze.....	10
Let's Try This.....	14
Let's See What You Have Learned.....	14
Let's Remember and Review.....	16
What Have You Learned?.....	17
Answer Key.....	19
References	21



What Is This Module About?

This module was designed and written with you in mind. It is here to help you master the Perimeter and Circumference. The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of learners. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module is divided into two lessons, namely:

Lesson 1 – Perimeter

Lesson 2 – Circumference

After going through this module, you are expected to:

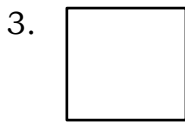
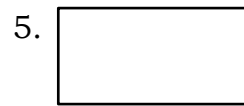
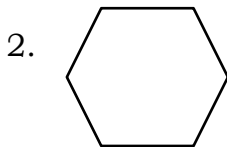
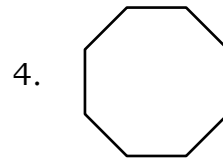
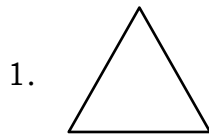
- explain the meaning of perimeter and its practical applications in daily life **(LS3MP-M-PSD-AE-39)**;
- measure the perimeter of any given figure using appropriate tools **(LS3MP-M-PSD-AE-40)**;
- apply the formula for computing perimeter and circumference **(LS3MP-M-PSD-AE-42)**;
- explain the meaning of circumference and related terms like radius, diameter, and their practical applications in daily life **(LS3MP-M-PSD-AE-44)**;
- measure the circumference of a circle using appropriate tools **(LS3MP-M-PSD-AE-45)**; and
- compute the diameter, radius, and circumference of a circle using the value of pi (π) **(LS3MP-M-PSD-AE-46)**.



Let's See What You Already Know

Activity 1

Directions: Study and identify the given figures by writing your answers on the lines provided. Write your answer on a separate sheet.



Activity 2

Directions: Read and understand each question carefully then write the letter of your choice on your answer sheet.

1. It is a two-dimensional closed figure that has all of its points at an equal distance from its center.
A. circle B. oval C. square D. triangle
2. A line segment that connects the center with a point on the circle.
A. chord B. circle C. diameter D. radius
3. It is a fixed point in the middle of the circle.
A. center B. chord C. diameter D. radius
4. It is the distance around the circle.
A. circumference B. chord C. diameter D. radius
5. It is a chord that passes through the center of the circle.
A. center B. chord C. diameter D. radius

Lesson

1

Perimeter



What Will You Learn From This Module?

The module is divided into two lessons, namely:

Lesson 1 – Perimeter

Lesson 2 – Circumference

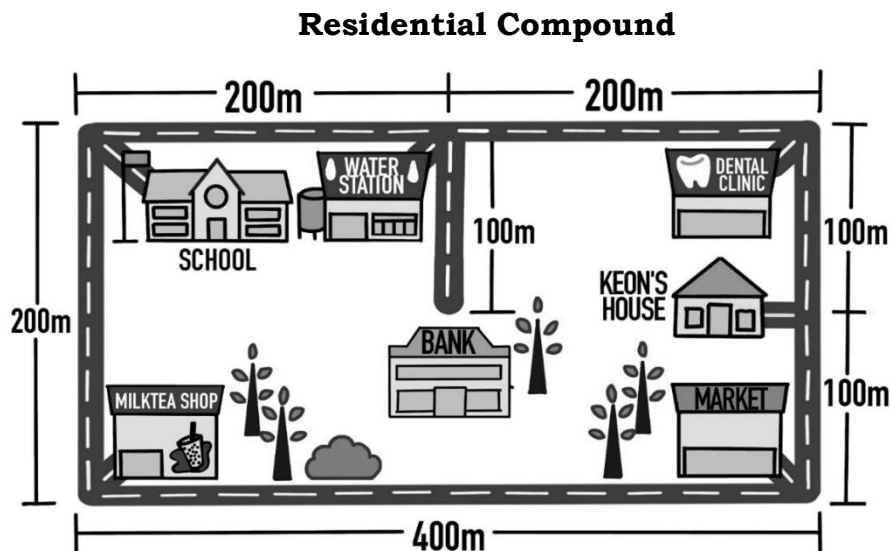
Have you walked around outside your house? If you have done this, you already have walked the distance of the house perimeter.

In this lesson, you will learn how to find the perimeter of a given figure. You can surely apply the things that you will learn from this lesson in your daily living.



Let's Do This

Study the map below. Answer the questions about it.



1. What is the distance from the milk tea shop to school?
2. What is the distance from the school to the dental clinic?
3. What is the distance from the dental clinic to Keon's house?
4. What is the distance from the market to the milk tea shop?
5. What is the total distance of the residential compound?

How did you get the total distance of the compound? Did you add all the given distances? In doing so, you were able to get the perimeter.



Let's Study and Analyze

A **perimeter** is a distance around a plane figure. We can calculate the perimeter by adding the lengths of all sides of the figure. Perimeter helps us understand the total distance around a shape. For example, if we want to put a fence around a garden, we need to measure the perimeter to determine how much fencing materials we will need.

Imagine a square. A square has four equal sides. To find its perimeter, we add up the length of each side. If each side measures 4 centimeters, then the perimeter of the square would be $4 + 4 + 4 + 4 = 16$ centimeters.

Polygon

A **polygon** is a plane shape described as having three or more straight lines and is connected to form a closed geometric shape. The term "polygon" comes from the Greek words "*poly*," meaning "many," and "*gonia*," meaning "angles." Polygons can also be classified based on the lengths of their sides or the measures of their angles.

Here are some of the common types of polygons:

Types of Polygon	Number of Sides	Number of Angles
Triangle	3	3
Quadrilateral	4	4
Pentagon	5	5
Hexagon	6	6
Heptagon	7	7
Octagon	8	8
Nonagon	9	9
Decagon	10	10

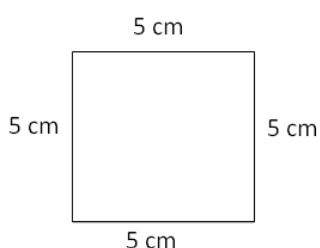
Finding the Perimeter of Polygons

A **regular polygon** refers to a polygon where all the sides have the same length and all the angles have the same measurement. It is a polygon characterized by equal sides and equal angles. Some examples of regular polygons are equilateral triangles, squares, and regular hexagons.

An **irregular polygon** is a type of polygon in which not all sides or angles are equal. It has sides and angles of different lengths and measures. Irregular polygons can have various shapes and sizes, and their sides and angles can vary throughout the shape. Examples of irregular polygons include rectangles, parallelograms, and most polygons that do not fit the criteria of regular polygons.

The perimeter is determined by adding the lengths of the sides of the polygon. We can use a ruler or a tape measure to measure the lengths of the sides of a regular and irregular polygon.

Regular Polygons



Example:

Solution:

Perimeter of square = $4s$

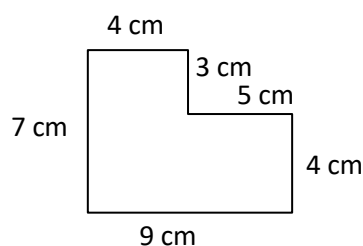
where s is the length of each side of the square

Perimeter = $s + s + s + s$

$= 5 \text{ cm} + 5 \text{ cm} + 5 \text{ cm} + 5 \text{ cm}$

$= 20 \text{ cm}$

Irregular Polygons



Example:

Solution:

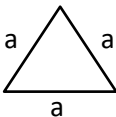
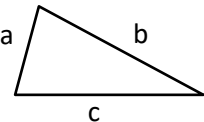
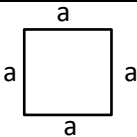
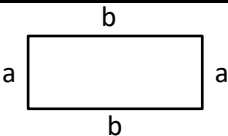
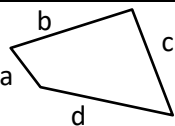
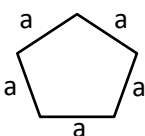
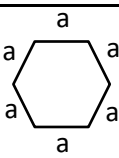
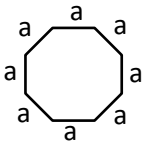
$$\text{Perimeter of irregular polygon} = S_1 + S_2 + S_3 + S_4 + \dots + S_n$$

$$\text{Perimeter} = s + s + s + s + s + s$$

$$= 4 \text{ cm} + 3 \text{ cm} + 5 \text{ cm} + 4 \text{ cm} + 9 \text{ cm} + 7 \text{ cm}$$

$$= 32 \text{ cm}$$

Here's how the perimeter of some common shapes is calculated:

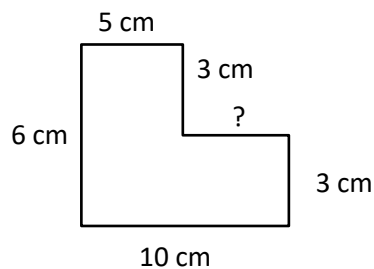
Polygon Name	Polygon Picture	Perimeter Formula
Equilateral Triangle		$P = 3 \times a$
Scalene Triangle		$P = a + b + c$
Square		$P = 4 \times a$
Rectangle		$P = 2 (a + b)$
Irregular		$P = a + b + c + d$
Regular Pentagon		$P = 5 \times a$
Regular Hexagon		$P = 6 \times a$
Regular Octagon		$P = 8 \times a$
Regular N-gon	A regular n-gon with each side a unit long	$P = n \times a$ Where n is the number of sides and a is the length of the sides

Choose five plane figures that you can see in your surroundings. Use a ruler or a meter stick to measure the lengths of the sides of each plane figure. Then on a separate paper, make a chart similar to the one below and record your answers.

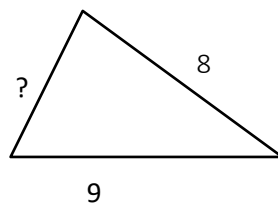
Plane Figure	Measure of Each Side	Perimeter
1.		
2.		
3.		
4.		
5.		

How to find the unknown side length given a perimeter?

1. The perimeter of the figure is 32 centimeters. What is the length of the missing side?



2. What is the length of the missing side if the perimeter is 24 inches?

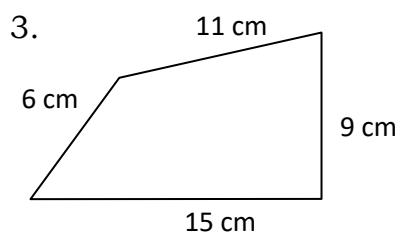
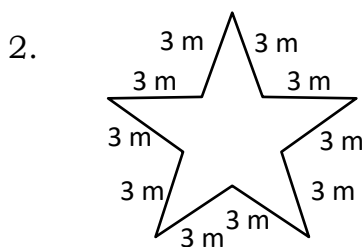
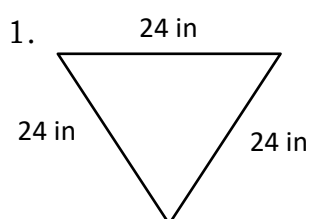


3. The perimeter of a square field is 200 m. Find the length of its side.
4. A rectangular garden is 120 m wide, with a perimeter of 600 m. Find the length of the field.
5. The perimeter of a rectangular park is 1200 m. Its width is 175 m. Find the length of the park.



Let's Try This

Directions: Solve the perimeter of each of the following polygons. Write your answer with a solution on a separate sheet of paper.



4. A rectangle has a length of 16 centimeters and a width of 8 centimeters. Find the perimeter.
5. Find the perimeter of a regular hexagon with each side measuring 8 meters.



Let's See What You Have Learned

Directions: Read and solve the following word problems. Write your answer with a solution on a separate sheet of paper.

1. The perimeter of the square table is 144 inches. What is the length of each side?
2. Find the distance travelled by Calvin if he takes 2 rounds of a square field with sides measuring 50 m.
3. Find the perimeter of the rectangular white board whose lengths and widths are 8 cm and 4 cm.
4. Find the perimeter of the rectangular room whose lengths and widths are 13 m and 9 m.
5. A piece of string is 60 cm long. What will be the length of each side if the string is used to form a square, and a triangle?

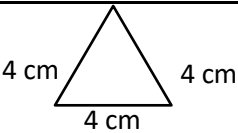
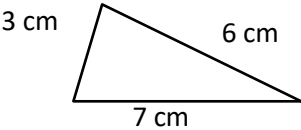
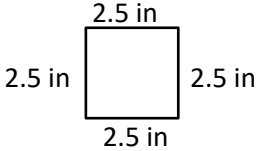
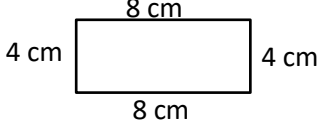
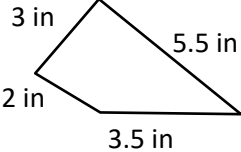
Lesson**2****Circumference**

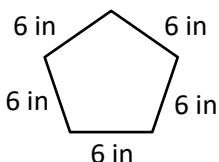
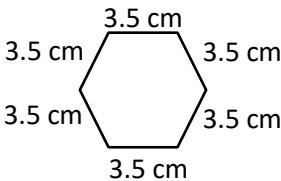
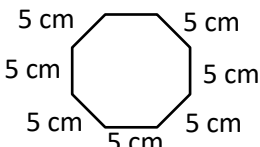
One of the simplest and most familiar figures you see around are circles. Circles can be found everywhere. Can you name objects with this shape?

This lesson is designed to introduce terms and concepts related to circles such as radius, diameter, and circumference. It also includes activities that will add to your understanding as they relate to experiences in your daily life.

**Let's Do This**

Let's recall the perimeter of the following polygons.
Compute the perimeter of given side lengths of a polygon.

Polygon name	Polygon Picture	Perimeter
1. Equilateral Triangle		
2. Scalene Triangle		
3. Square		
4. Rectangle		
5. Quadrilateral		

6. Regular Pentagon		
7. Regular Hexagon		
8. Regular Octagon		



Let's Study and Analyze

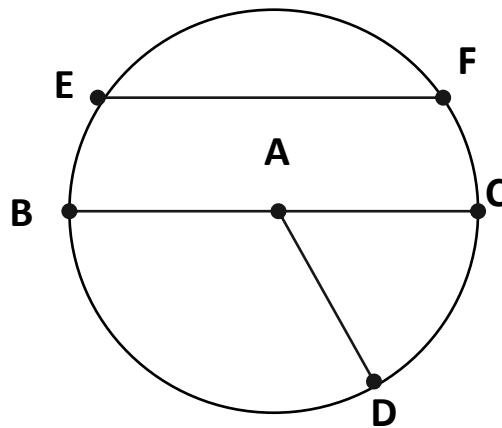
Have you noticed that the previous activities did not ask for the perimeter of a circle? Why do you think so? How do you find the perimeter of a circle?

The perimeter of a circle has own special name called **circumference**. The symbol is a capital C. The formula of the circumference is $C = \pi \times \text{diameter}$ ($C = \pi \cdot d$), or $3.14 \times d = C$. It can also be calculated by $C = 2 \times \pi \times \text{radius}$ ($C = 2\pi r$) or $3.14 \times 2r$.

A **circle** is a two-dimensional closed figure that has all of its points at an equal distance from a point called its **center**. A circle is named by its center.

Center is the midpoint where all radii intersect. It can also be defined as the midpoint of the diameter of the circle.

The figure and table below show and explain the parts of a circle.



Part	Definition	Examples
Radius	A line segment that connects the center of circle to any point of its boundary. Two or more line segments are called radii.	$\overline{AB}, \overline{AC}, \overline{AD}$
Chord	A line segment that connects two points on the circle's circumference.	$\overline{BC}, \overline{EF}$
Diameter	A line segment that passes through the center of a circle. and connects two points on the circle's circumference.	$\overline{BC}$
Arc	An arc is a portion of a circle, similar to a section of the circle between two points.	$\widehat{BE}, \widehat{EF}, \widehat{FC}, \widehat{CD},$ $\widehat{DB}$
Sector	A region bounded by two radii and the arc between them, forming a pie-shaped portion of the circle.	Sector BAD, sector CAD, sector BAC

Relation Between Diameter and Radius

What is the relation between diameter and radius?

Solution: The diameter of a circle is twice of its radius.

Formula: diameter = 2 x radius

$$\text{radius} = \frac{\text{diameter}}{2}$$

Examples:

1. Find the diameter of a circle whose radius is 7.5 cm.

Solution: We know that the diameter is twice the radius.

$$\text{radius} = 7.5 \text{ cm}$$

$$\text{diameter} = 2 \times 7.5 \text{ cm}$$

$$= 15 \text{ cm}$$

Therefore, diameter = 15 cm

2. Find the radius of a circle whose diameter is 9 cm.

Solution: We know, radius = $\frac{\text{diameter}}{2}$

$$\text{diameter} = 9 \text{ cm}$$

$$\text{radius} = \frac{9}{2} \text{ cm}$$

$$= 4.5 \text{ cm}$$

Therefore, radius = 4.5 cm

What is Circumference?

Circumference is the distance around the circle.

The formula for finding the circumference is $C = 2\pi r$

Where:

r is the length of the radius

If you know the length of the diameter, you can use the formula $C = \pi d$.

What is π ?

π (**pi**) is the ratio of the circumference of a circle to its diameter. The value of pi is approximately 3.14. It is a non-repeating and non-terminating decimal.

If you are given the length of the radius, use $C = 2\pi r$.

Example 1: Finding circumference of a circle when its radius is given.

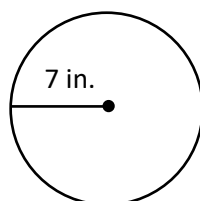
What is the circumference of a circle with a radius of 7 in?

Solution:

$$C = 2\pi r$$

$$C = 2 \times 3.14 \times 7$$

$$C \approx 43.96 \text{ in. or } 44 \text{ in}$$



If you are given the length of the diameter, use $C = \pi d$.

Example 2: Finding circumference of a circle when its diameter is given.

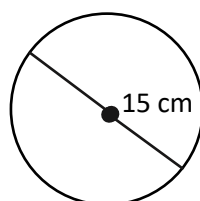
What is the circumference of a circle with a diameter of 15 cm?

Solution:

$$C = \pi d$$

$$C = 3.14 \times 15$$

$$C \approx 47.1 \text{ cm or } 47 \text{ cm}$$



Now, let's find objects with circular surfaces around us.

Materials Needed

1. String (long enough to wrap the objects)
2. Ruler or measuring tape
3. Sheet of paper
4. Pencil or pen

Instructions

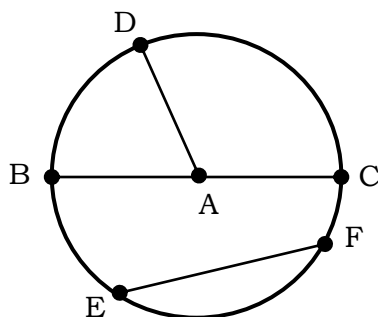
1. Look for five things that have a circular surface like plate, lid, coin, and electric fan.
2. Take a string and wrap it around the circular surface of an object. Make sure it's tight and not too loose.
3. Cut the string where it meets the starting point.
4. Take a ruler or measuring tape and measure how long the string is. Use metric units in getting measurements.
5. Write down your measurements on a separate piece of paper using the chart below.
6. Then compute the diameter and radius.

Objects	Circumference	Diameter	Radius
1.			
2.			
3.			
4.			
5.			



Let's Try This

- A. Directions: Refer to the figure to answer the questions. Write your answer with a solution on a separate sheet of paper.



1. Which line segment is a diameter?
 2. Which line segment is not a radius?
 3. What are the radii of the circle?
 4. If the length of the radius is 8 cm, what is the circumference of the circle?
 5. If the diameter of the circle is 16 inches, what is the length of its radius?
- B. Directions: Solve the following problems. Write your answer on a separate sheet of paper. Show your solution.
1. Find the diameter of a circle whose radius is 3.5 cm.
 2. Find the radius of a circle whose diameter is 11 cm.
 3. Find the circumference of a circle with a radius of 23 inches.
 4. Find the circumference of a circle with a diameter of 32 cm.
 5. Find the circumference of a circle with a radius of 6.5 inches.



Let's See What You Have Learned

Directions: Read and solve the following problems. Write your answer with a solution on a separate sheet of paper.

1. Kratos Wade's bike tire has a radius of 5 inches. Find the circumference of the tire.
2. A plastic plate has a diameter of 12 cm. Find its circumference.
3. A hamster wheel has a diameter of 13 inches. Find its circumference.
4. What is the circumference of a Ferris wheel with radius of 6.5 ft?
5. The radius of an electric fan is 4.5 cm. What is the diameter?

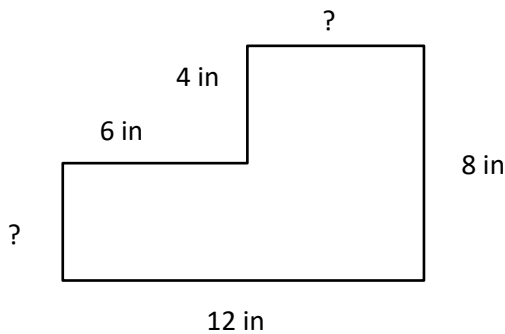


Explore More

A. Directions: Read and analyze the following problems. Write your answer with a solution on a separate sheet of paper.

1. The perimeter of a rectangular football field is 500 m. If the length is 160 m long, find its width.
2. A square garden has a perimeter of 60 m. Find its side.
3. What is the length of each missing side if the width is 16 inches on each side and a perimeter of a rectangular table is 184 inches?

For numbers 4 and 5, refer to the figure below.



4. Find the missing side of the given irregular polygon.
5. Find its perimeter.

B. Directions: Read and solve the following problems. Write your answer with a solution on a separate sheet of paper.

1. Mr. Enriquez bought a circular lot with a diameter of 70 m. What is its circumference?
2. Mr. Vince would like to fence his circular garden that has a radius of 40m. How many meters of wire will he need?
3. Kaycee bought an egg pie for a family dinner with a radius of 24 inches. What is the circumference of the egg pie?
4. The wheel of a truck has a diameter of 19 inches. What is its circumference?
5. What is the circumference of a plate with a radius of 8 centimeters?



Let's Remember and Review

1. Perimeter is a distance around a plane figure. We can calculate the perimeter by adding the lengths of all sides of the figure.
2. We use a ruler or tape measure to measure the lengths of the sides of a regular and irregular polygon.
3. The perimeter is determined by adding the lengths of the sides of the shape.
4. The perimeter is a measure of distance or length. It has to be measured in units like centimeters, meters, inches, or feet.
5. The perimeter of all polygons can be determined by adding the lengths of their sides.
 - For a rectangle, $P = (l \times 2) + (w \times 2)$
Where: P = perimeter of a rectangle
 l = measure of the length
 w = measure of the width
 - For a square, $P = 4s$
Where: P = perimeter of a square
 s = measure of a side of a square
6. A circle is a two-dimensional closed figure that has all of its points at an equal distance from a point called its center.
7. Radius is a line segment that connects the center with a point on the circle. Two or more are called radii.
8. Chord is a line segment that connects two points on the circle.
9. Diameter is a chord that passes through the center of the circle.
10. Circumference is a distance around the outside of a circle. The formula in finding the circumference is $C = 2\pi r$. If you know the length of the diameter, you can use the formula $C = \pi d$.
11. π (pi) is the ratio of the circumference to the diameter of a circle. The value of pi is approximately 3.14. It is a nonrepeating and nonterminating decimal.
 - The formula then for the circumference of a circle is $C = \pi \times d$.
Where: C = the circumference
 π = pi (3.14)
 d = diameter of the circle



What Have You Learned?

Directions: Read and understand each question carefully then write the letter of your choice on your answer sheet.

1. It is the distance around the circle.
 - A. chord
 - B. circumference
 - C. diameter
 - D. radius
2. It is a line segment that connects the center with a point on the circle.
 - A. chord
 - B. circumference
 - C. diameter
 - D. radius
3. It is a chord that passes through the center of the circle.
 - A. center
 - B. chord
 - C. diameter
 - D. radius
4. This is a two-dimensional closed figure that has all of its points at an equal distance from its center.
 - A. circle
 - B. oval
 - C. square
 - D. triangle
5. It is a fixed point in the middle of a circle.
 - A. center
 - B. chord
 - C. diameter
 - D. radius
6. This is the distance around a plane figure.
 - A. area
 - B. perimeter
 - C. polygon
 - D. shape

7. We find the perimeter of a plane figure by _____
- A. adding the lengths of all sides.
 - B. multiplying the base by the height.
 - C. multiplying the lengths of all sides.
 - D. using the same way as you find the area.
8. If the side of square is 5 inches, what is its perimeter?
- A. 10 inches
 - B. 15 inches
 - C. 20 inches
 - D. 25 inches
9. The perimeter of which shape can be calculated using the formula $(\text{length} + \text{width}) \times 2$?
- A. circle
 - B. hexagon
 - C. rectangle
 - D. triangle
10. What is the radius of a circle with a diameter of 24?
- A. 12
 - B. 28
 - C. 32
 - D. 48



Answer Key

Lesson 1

Let's See What You Have Learned 1. 36 inches 2. 400 m 3. 24 cm 4. 44 m 5. Square = 15 cm; Triangle = 20 cm	Let's Try This A 1. 72 in 2. 30 m 3. 41 cm 4. 48 m 5. 48 m B 1. 90 m 2. 15 m 3. 60 in 4. 6 in; 4 in 5. 40 in 5. 40 in	Let's Do This 1. 200 m 2. 400 m 3. 100 m 4. 400 m 5. 1200 m	Let's See What You Already Know Activity 1 1. Triangle 2. Hexagon 3. Square 4. Octagon 5. Rectangle Activity 2 1. A 2. D 3. A 4. A 5. C
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Lesson 2

Explore More A 1. 170 m 2. 15 m 3. 76 inches 4. 6 in ; 4 in 5. 40 inches B 1. C $\approx$ 219.8 m 2. C $\approx$ 251.2 m 3. C $\approx$ 150.72 in 4. C $\approx$ 59.66 in C $\approx$ 50.24 cm	Let's See What You Have Learned 1. 31.4 in or 31 in 2. 37.68 m or 38 m 3. 40.82 cm or 41 cm 4. 40.82 cm or 41 cm 5. 9 cm	Let's Try This Activity 1 1. <u>BC</u> 2. 8 inches 3. <u>BC</u> , <u>EF</u> 4. <u>AB</u> , <u>AD</u> , <u>AC</u> 5. 50.24 cm or 50 cm Activity 2 1. 7 cm 2. 5.5 cm 3. 46 in 4. 16 cm 5. 13 in	What You Have Learned 1. A 2. A 3. D 4. C 5. A 6. A 7. D 8. A 9. A 10. C	Let's Do This 1. 12 cm 2. 16 cm 3. 10 in 4. 24 cm 5. 14 in 6. 30 in 7. 21 cm 8. 40 cm
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Glossary

Arc is a portion of a circle similar to a section of the circle between two points.

Center is the midpoint where all radii intersect. It can also be defined as the midpoint of the diameter of the circle.

Circle is a two-dimensional closed figure that has all of its points.

Circumference is a distance around the circle. The formula for finding the circumference is $C = 2\pi r$.

Chord is a line segment that connects two points on the circle's circumference.

Decagon is a polygon with ten sides and ten angles.

Diameter is a chord that passes through the center of the circle.

Hexagon is a polygon with six sides and six angles.

Heptagon is a polygon with seven sides and seven angles.

Irregular polygon is a polygon that does not have all sides or angles equal. It has sides and angles of different lengths and measures.

Measurement is finding a number that shows the size, length or amount of something.

Nonagon is a polygon with nine sides and nine angles.

Octagon is a polygon with eight sides and eight angles.

Pentagon is a polygon with five sides and five angles.

Perimeter is a distance around an object.

Polygon is a plane shape described as having three or more straight lines and is connected to form a closed geometric shape.

Quadrilateral is a polygon with four sides and four angles.

Radius is a line segment that connects the center with a point on the circle. Two or more are called radii.

Regular polygon is a polygon that has all sides of equal length and all angles of equal measure.

Sector is a region bounded by two radii and the arc between them, forming a pie-shaped portion of the circle.

Triangle is a polygon with three sides and three angles.

π (**pi**) is the ratio of the circumference to its diameter. The value of pi is approximately 3.14, it is a nonrepeating and nonterminating decimal.

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For inquiries or feedback, please write or call:

Department of Education - Bureau of Alternative Education (DepEd-BAE)

5th Floor, Bonifacio Bldg., DepEd Complex
Meralco Avenue, Pasig City, Philippines 1600

Telephone No.: 08-636-36-036

Email Address: bae.od@deped.gov.ph * bae.pmsdd@deped.gov.ph