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Mathematics

Quarter 3 – Module 8:
Finding the Surface Area of Cubes, Prisms, Pyramids, Cylinders, Cones and Spheres

ALTERNATIVE DELIVERY MODE
ADM

**Mathematics – Grade 6
Alternative Delivery Mode
Quarter 3 – Module 8: Finding the Surface Area of Cubes, Prisms, Pyramids, Cylinders Cones and Spheres.
First Edition, 2021**

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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 will help you learn the skills to find the surface area of cubes, prisms, pyramids, cylinders, cones and spheres. The scope of this module used in different learning situations. The language used recognizes your diverse vocabulary level. The lessons are arranged to follow the standard sequence of your course. But the order in which you study them can be rearranged to match the textbook you are now using.

After going through this module, you are expected to be able to find the surface areas of cubes, prisms, pyramids, cylinders, cones and spheres.

What I Know

Read and solve the following problem. Write your answer in your answer sheet.

1. Find the circumference of a circular pool with a diameter length of 5m.

2. A rectangular lot has a width of 15 m and length of 20 m. What is the area of the lot?

3. A billboard is in a shape of a triangle with dimensions - 8 meters across its base and 9 meters high. What is the area of the bill board?

4. MJ's vegetable garden has 4 sides. Each side has is in shape of a trapezoid. The bases measure 12 cm and 32 cm. The height is 28 cm. What is the total area of the 4 sides?

5. Which area is larger, the area of a circle 9 dm in diameter or the area of a square whose side is 9 dm? How much larger?
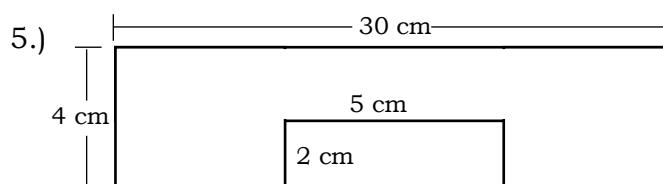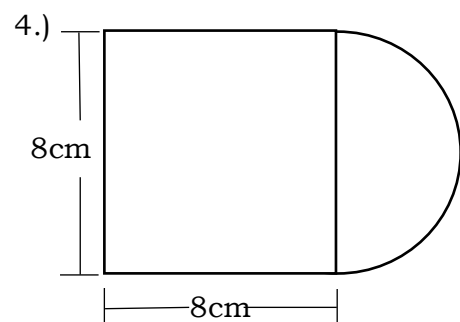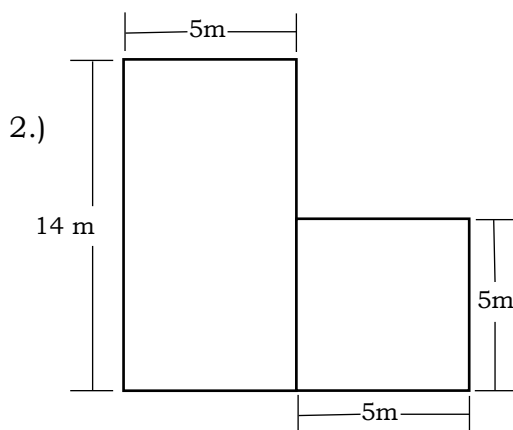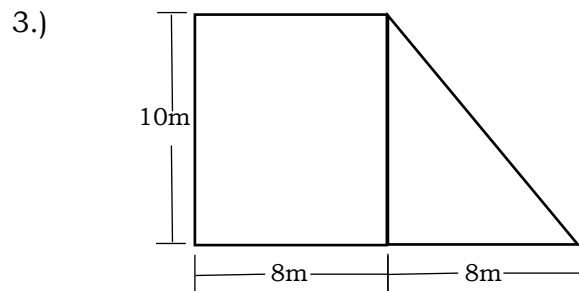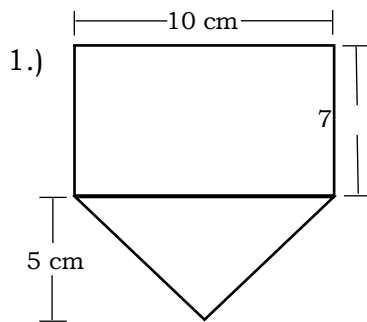
Lesson 1	**Finding the Surface Area of Cubes, Prisms, Pyramids, Cylinders, Cones, and Spheres**

In the previous lessons you have learned how to find the area of composite figures form by any two or more of the following figures such as triangle, square, rectangle, circle, and semi-circle. This time, we will focus on how to find the surface area of cubes, prisms, pyramids, cylinders, cones and spheres.

What's In

Find the area of the following composite figures.

1.)

```
|——— 10 cm ———|
              7
5 cm
```

3.)

```
10m
   |— 8m —|— 8m —|
```

2.)

```
|— 5m —|
14 m
          5m
   |— 5m —|
```

4.)

```
8cm
   |— 8cm —|
```

5.)

```
|———————— 30 cm ————————|
4 cm        5 cm
            2 cm
```

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What's New

Study and analyze the problem below.

> A rectangular box measuring 4 cm by 5 cm by 2 cm. How many square meters of wrapping paper are needed to cover the four sides of the box?

Can you solve the problem?

What is It

To find the surface area of solid figures such as cubes, prisms, pyramids, cylinders, cones and spheres, you may use the following formula:
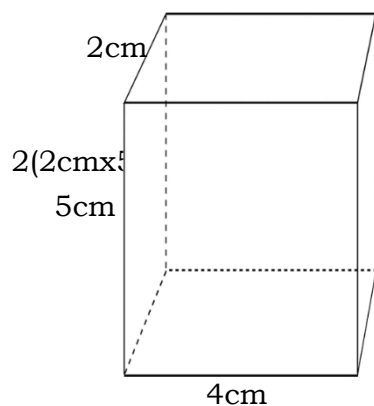
A. Surface Area of Prism [Rectangular Prism]

FORMULA:

Surface Area=2(length x width)+2(length x height)+2(width x height)

or

> SA=2(lw) + 2(lh) + 2(wh)

Example: Solve for the surface area of the given figure:

2cm

2(2cmx5

5cm

4cm

Solution:

SA = 2(lw) + 2(lh) + 2 (wh)

SA = 2(4cmx2cm) + 2(4cmx5cm) +

SA = $2(8cm^2) + 2(20cm^2) + 2(10cm^2)$

SA = $16cm^2 + 40cm^2 + 20cm^2$

SA = $76cm^2$

B. Surface area of a Cube
  FORMULA:

Surface Area = 6 x side x side

or

SA=6xSxS

Example: Solve for the surface area of the given figure below:

2cm

2cm

2cm

Solution:

SA=6xSxS

SA=6x2cmx2cm
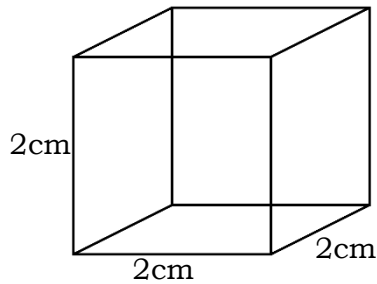
SA=6x4cm²

SA=24cm²

C. Surface Area of a Pyramid

FORMULA:

Surface Area=area of Base + 4(area of face)

or

$$SA = 4(\frac{1}{2} bh)$$

Example: Solve for the surface area of this square pyramid.
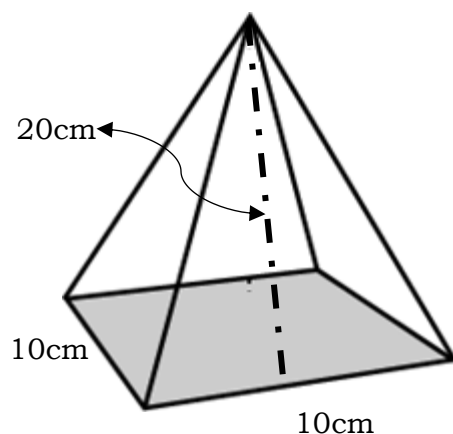
20cm

10cm

10cm

Solution:

SA = (Area of the Base) + $4(\frac{1}{2} bh)$

SA=10cm x 10cm + 4 ($\frac{1}{2}$ 10cm x 20cm)

SA=100cm² + 4 ($\frac{1}{2}$ x 200cm²)

SA=100cm² + 4(100cm²)

SA=100cm² + 400cm²

SA= 500cm²

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D. Surface Area of a Cylinder

To solve the surface area of the cylinder, find the lateral area and area of the base.
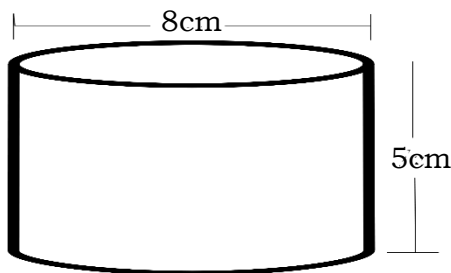
Lateral area = 2πrh

Surface Area = lateral area + 2(area of a circular base)

or

| SA=2πrh + 2πr² |

Example: Solve for the surface area of the given figure below:

Solution:

SA=2πrh + 2πr²

SA=2 x 3.14 x 4cm x 5cm + 2 x 3.14 x 4cm x 4cm

SA=6.28 x 20cm² + 6.28 x 16cm²

SA=125.6cm² + 100.48cm²

SA=226.08 cm²

E. Surface Area of a Cone

To find the surface area of the cone, find the sum of the lateral area and area of its base.

Lateral area = πrs

Formula:
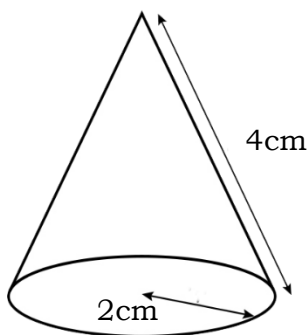Surface Area=area of the base +area of the curved surface

or

| SA= πrs + πr² |

Example: Solve the surface of the cone.

Solution:

SA= πrs + πr²

SA= 3.14 x 2cm x 4cm + 3.14 x 2cm x 2cm

SA= 3.14 x 8cm² + 3.14 x 4cm²

SA= 25.12cm² + 12.56cm²
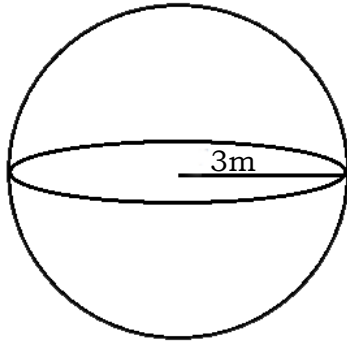
SA=37.68cm²

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F. Surface Area of a Sphere
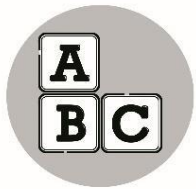
Surface Area = 4 x area of the circle

or

$$SA = 4\pi r^2$$

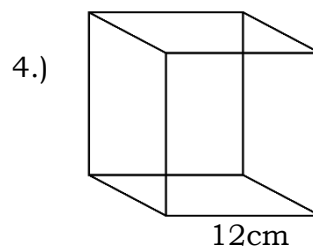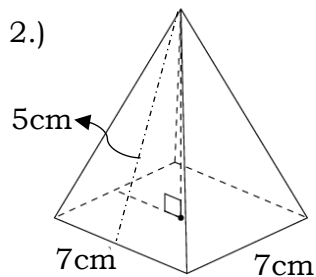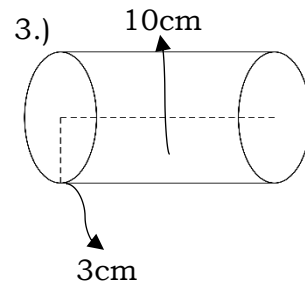Example:

3m

Solution:

SA= $4\pi r^2$

SA = 4(3.14) (3m) (3m)

SA = 12.56 x 9m²

SA=113.04m²

What's More

A. Find the surface area of each solid figure.

1.)

6m

12m

4m

2.)

5cm

7cm   7cm

3.)

10cm

3cm

4.)

12cm
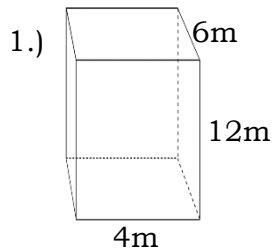
B. Read and solve. Write your solution with label on your answer sheet.

   MJ saw a toy plastic ice cream cone while digging a pit of garbage. The slant height of the cone measured 3 cm and its radius is 2cm. Find the needed amount of paint to cover the entire surface of the cone.

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What I Have Learned

To find the surface area of cubes, prisms, pyramids, cylinders, cones and spheres, you may use the following formula:

Solid Figure	Formula in Finding the Surface Area
Rectangular Prism	SA=2(lw)+2(lh)+2(wh) or SA = 2(lw + lh + wh)
Cube	$SA = 6s^2$
Pyramids	SA=Area of the base + Area of the lateral faces $SA = B + 4\left(\frac{1}{2}bh\right)$
Cylinder	$SA = 2\pi rh + 2\pi r^2$
Cone	$SA = \pi rs + \pi r^2$
Sphere	$SA = 4\pi r^2$

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What I Can Do

Direction: Find the surface area of each solid figure. Write your answer on your answer sheet.

1.) 5cm

2.) 8m 2m

3.) 11cm

4.) 10cm 7cm 15cm

5.) 20m 4m 2m
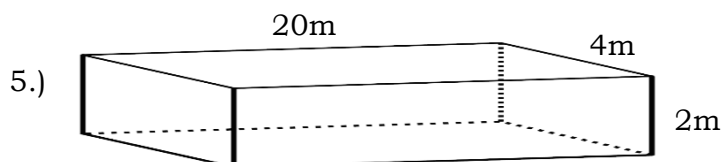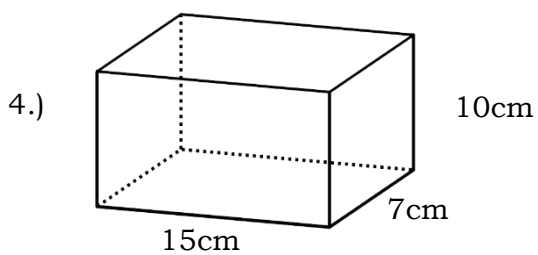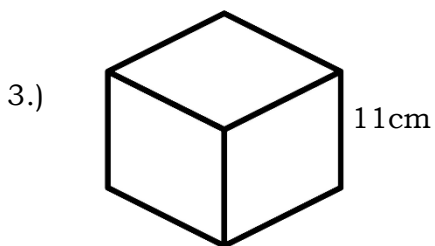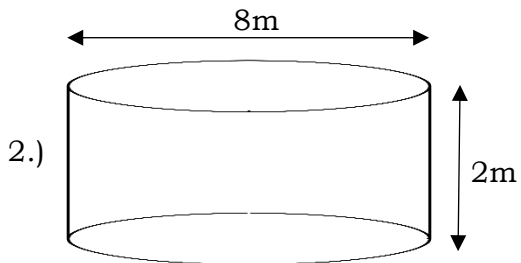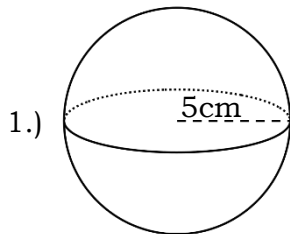
Assessment

A. Find the surface area of each solid figure. Write your answer on your answer sheet.

1.)

10m

4m

4.

21cm

3.

12m

2m

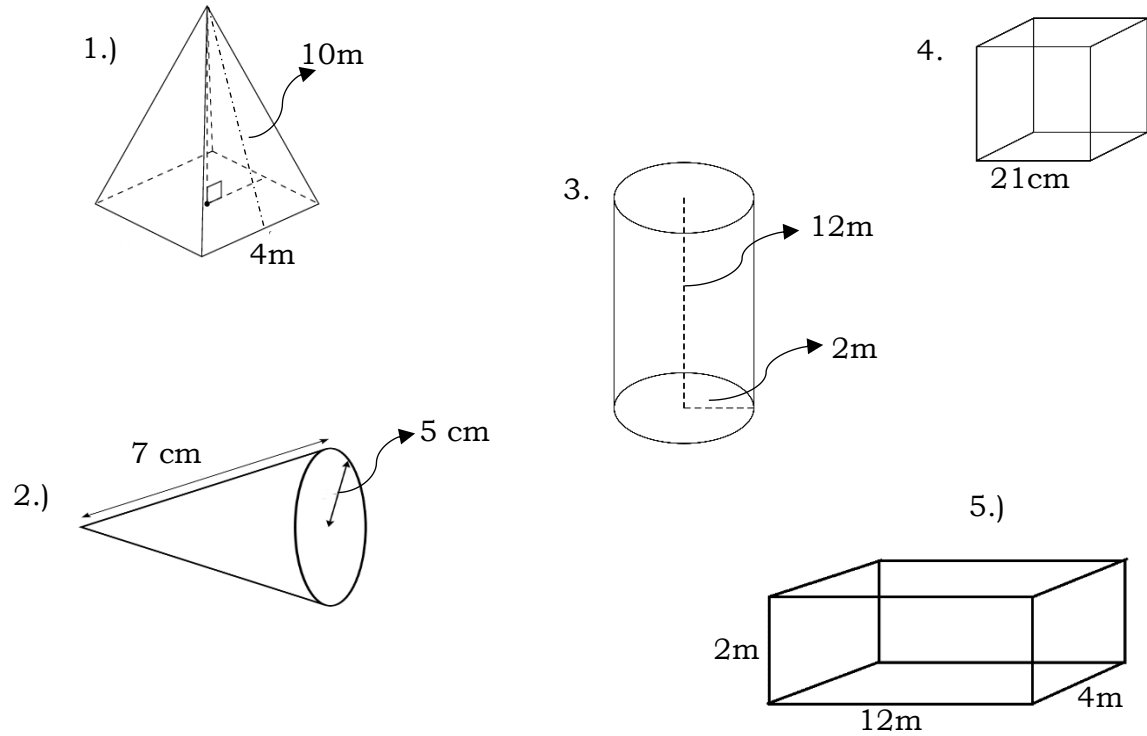2.)

7 cm   5 cm

5.)

2m

12m

4m

B. Read and solve the problem. Write your solution on your answer sheets.

1. The surface area of a cube is 486 cm².What is the length of each edge?
2. Each edge of a cube is 6cm long. Find the surface area of the cube.
3. A rectangular prism is 8m by 3 m by 2 m. Find its surface area.
4. A hatbox is in a shape of a cylinder that has a diameter of 12cm and a height of 11 cm. How much paper is needed to cover the box?

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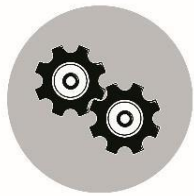
Additional Activities

Directions: Read the problem carefully and solve.

PROBLEM:

JM is making a birthday gift for his father's birthday. The box for the gift he is using is a rectangular prism with a length of 4m, a width of 2m and a height of 3m. How many square meters of paper does he need to wrap the entire box?

QUESTIONS:

1. What is asked in the problem?

2. What are the given facts that will help you solve the problem?

3. What is the formula that can be used to solve the problem?

4. What is the number sentence?

5. What is the answer to the problem?

Answer Key

What I Know

1. 15.7 m
2. 300 m²
3. 36 m²
4. 616 cm²
5. Area of a square, a difference of 17.415 dm²

What's In

1. 95 cm²
2. 95 m²
3. 120 m²
4. 89.12 cm²
5. 110 cm²

What's More

1. 288 m²
2. 119 cm²
3. 244.92 cm²
4. 864 cm²
B. 31.4 cm²

What I Can Do

1. 314 cm²
2. 150.72 m²
3. 726 cm²
4. 650 cm²
5. 256 cm²

Assessment

A
1. 96 m²
2. 188.4 cm²
3. 175.84 m²
4. 2,646 cm²
5. 160 m²
B
1. 9 cm
2. 216 cm²
3. 92 m²
4. 640.56 cm²

Additional Activities

1. the total number of sq. meter of paper he needs to wrap the entire box
2. length of 4m, width of 2m and a height of 3m
3. SA=2(lxw)+2(lxh)+2(wxh)
4. 2(4m x 2m)+2(4m x 3m)+2(2m x 3m)=N
5. 52m² of paper she need to wrap the entire box

References:

A. Book

1. M Perez et. al., *21st Century MATHletes 6* (Philippines, Vibal Group Inc., 2016).

2. *Most Essential Learning Competencies in Mathematics 6* (Philippines, Department of Education, 2021).

For inquiries or feedback, please write or call:

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