

## Oregon Focus on Surface Area and Volume

### Practice Test ~ Surface Area

Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

#### Long/Short Term Learning Targets

**MA.MS.07.ALT.05:** I can solve problems and explain formulas involving surface area of geometric solids.

MA.MS.07.AST.05.1: I use and justify formulas for the areas of 2-dimensional polygons.

MA.MS.07.AST.05.2: I can represent 3-dimensional solids by drawing and using nets to find surface area.

MA.MS.07.AST.05.3: I can find surface area of cubes, right prisms, pyramids, right cylinders, and cones.

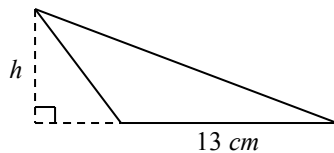
MA.MS.07.AST.05.4: I can solve problems involving surface areas of solids composed of cubes, right prisms, pyramids, right cylinders, and cones.

MA.MS.07.AST.05.5: I can describe the 2-D figures that result from slicing 3-D figures.

#### Part I – Multiple Choice

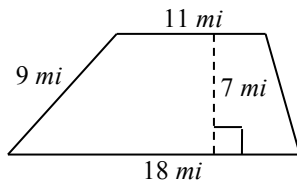
1. The area of the triangle, shown below, is  $39 \text{ cm}^2$ . What is the height of the triangle?

- A. 3 cm
- B. 6 cm
- C. 6.5 cm
- D. 13 cm



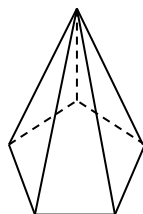
2. The area of the trapezoid is \_\_\_\_\_.

- A.  $203 \text{ mi}^2$
- B.  $130.5 \text{ mi}^2$
- C.  $116 \text{ mi}^2$
- D.  $101.5 \text{ mi}^2$



3. What is the name of the solid shown?

- A. Cone
- B. Hexagonal prism
- C. Octagonal pyramid
- D. Pentagonal pyramid



4. A rectangular prism has \_\_\_\_\_ vertices.

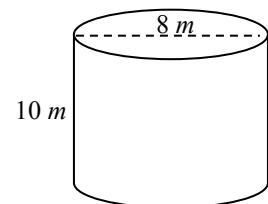
- A. 2
- B. 6
- C. 8
- D. 12

5. A rectangular gift box is 9 inches wide, 12 inches long and 5 inches tall. How much wrapping paper is needed to cover the box exactly?

- A.  $540 \text{ in}^2$
- B.  $426 \text{ in}^2$
- C.  $213 \text{ in}^2$
- D.  $26 \text{ in}^2$

6. What is the surface area of the cylinder shown below?

- A.  $18 \text{ m}^2$
- B.  $80 \text{ m}^2$
- C.  $251.2 \text{ m}^2$
- D.  $351.68 \text{ m}^2$



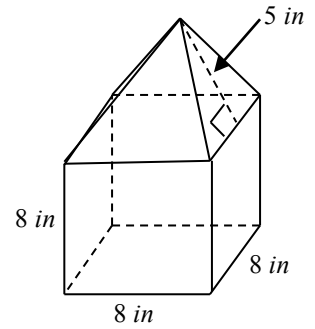
7. The perimeter of the base of a square pyramid is 12 *yd.* The slant height of the pyramid is 4 *yd.* What is the surface area of the pyramid?

- A. 33 square yards
- B. 48 square yards
- C. 57 square yards
- D. 168 square yards

8. Yasmine makes candles shaped like cones. Each candle has a slant height of 3 inches and a 1 inch radius. What is the surface area of one candle?

- A. 9.42 *in*<sup>2</sup>
- B. 12.56 *in*<sup>2</sup>
- C. 18.84 *in*<sup>2</sup>
- D. 21.98 *in*<sup>2</sup>

9. What is the surface area of the figure below?



- A. 528 *in*<sup>2</sup>
- B. 400 *in*<sup>2</sup>
- C. 384 *in*<sup>2</sup>
- D. 168 *in*<sup>2</sup>

10. A cone is sliced perpendicular to its base. What shaped is formed by the slice?

- A. Circle
- B. Rectangle
- C. Sphere
- D. Triangle

## Part II – Free Response

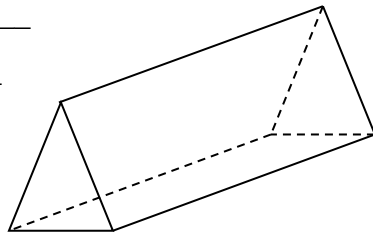
Name each solid. Find the number of vertices, edges and faces.

1. Name of solid \_\_\_\_\_

Vertices \_\_\_\_\_

Edges \_\_\_\_\_

Faces \_\_\_\_\_

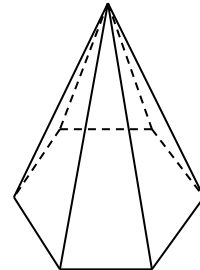


2. Name of solid \_\_\_\_\_

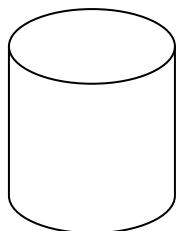
Vertices \_\_\_\_\_

Edges \_\_\_\_\_

Faces \_\_\_\_\_

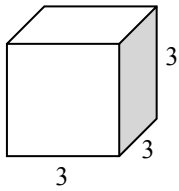


3. Draw a net for the solid shown below.

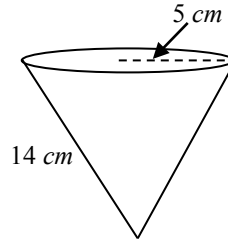


Find the lateral area of each solid. Use 3.14 for  $\pi$ .

4. Lateral Area = \_\_\_\_\_

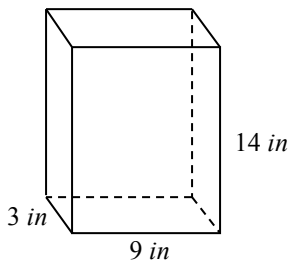


5. Lateral Area = \_\_\_\_\_

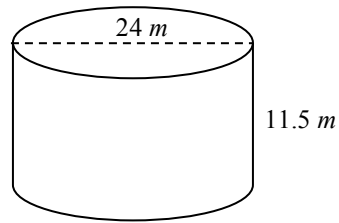


Find the surface area of each solid. Use 3.14 for  $\pi$ .

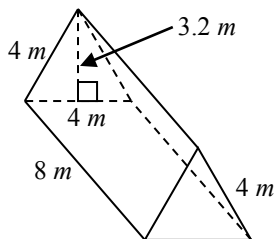
6. Surface Area = \_\_\_\_\_



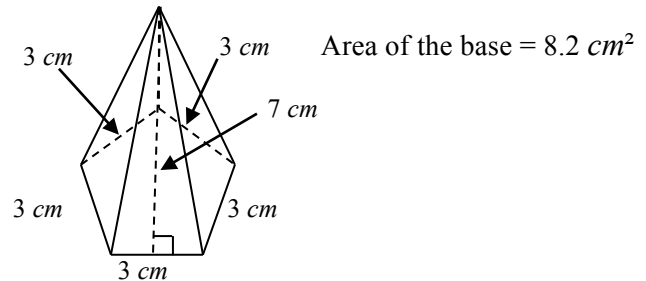
7. Surface Area = \_\_\_\_\_



8. Surface Area = \_\_\_\_\_



9. Surface Area = \_\_\_\_\_



10. A gift box is shaped like a cylinder with a cone on top of it. The radius of the gift box is 8 inches. The cylindrical part is 6 inches tall and the cone had a slant height of 10 inches. Find the exact amount of wrapping paper needed to wrap the gift box. Use 3.14 for  $\pi$ .

Answer: \_\_\_\_\_

11. The perimeter of the base of a square pyramid is 24 *ft*. The slant height of the pyramid is 9 *ft*.
- a. Find the lateral area of the pyramid.

Answer: \_\_\_\_\_

- b. Find the surface area of the pyramid.

Answer: \_\_\_\_\_

12. A cone is sliced perpendicular to its base. What shape is formed by the slice?

Answer: \_\_\_\_\_

### Part III – Problem Solving

Titanium costs \$14.39 per square foot. John is trying to find the cost of making a titanium cylindrical storage tank. The tank needs to have a 4-foot diameter and be 9 feet tall. Find the cost of making one tank. Use 3.14 for  $\pi$ .

Show your work here:

Explain your work here:

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	<b>Developing (1)</b>	<b>Nearly Proficient (2)</b>	<b>Proficient (3)</b>	<b>Highly Proficient (4)</b>
<b>Understanding</b>	Clearly doesn't understand the problem.	Has some misunderstanding of the problem.	Understands the problem, but not completely.	It is clear that the problem is understood.
<b>Work Shown</b>	There was no work shown.	There was some work shown.	Can follow the work shown, but it's incomplete.	All steps were shown.
<b>Explanation</b>	There was little to no explanation of the procedures.	There was a partial explanation of the procedure.	There was an explanation for the procedure.	There was a complete explanation for the procedure.
<b>Answer</b>	The answer was incorrect with incorrect procedures.	The answer was incorrect, but the procedures were correct/partly correct.	Has the correct answer and procedures, with slight errors.	The answer and procedures were correct with no errors.

## Circle Formulas

<b>Circumference</b> $C = 2\pi r = d\pi$	<b>Circle Area</b> $A = \pi r^2$
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## Area Formulas

<b>Rectangle Area</b> $A = lw$	<b>Parallelogram Area</b> $A = bh$
<b>Triangle Area</b> $A = \frac{1}{2}bh$	<b>Trapezoid Area</b> $A = \frac{1}{2}h(b_1 + b_2)$

## Lateral & Surface Area Formulas

<b>Lateral Area of a Prism</b> $LA = Ph$  <i>P</i> = perimeter of base <i>h</i> = prism height <i>B</i> = area of base  <b>Surface Area of a Prism</b> $SA = LA + 2B$ $SA = Ph + 2B$	<b>Lateral Area of a Cylinder</b> $LA = Ch = 2\pi rh$  <i>C</i> = circle circumference <i>r</i> = circle radius <i>h</i> = cylinder height  <b>Surface Area of a Cylinder</b> $SA = LA + 2B$ $SA = 2\pi rh + 2\pi r^2$
<b>Lateral Area of a Pyramid</b> $LA = \frac{1}{2}Pl$  <i>P</i> = perimeter of base <i>l</i> = slant height <i>B</i> = area of base  <b>Surface Area of a Pyramid</b> $SA = LA + B$ $SA = \frac{1}{2}Pl + B$	<b>Lateral Area of a Cone</b> $LA = \frac{1}{2}Cl = \pi rl$  <i>C</i> = circle circumference <i>r</i> = circle radius <i>l</i> = slant height  <b>Surface Area of a Cone</b> $SA = LA + B$ $SA = \pi rl + \pi r^2$