

Surface Area Sprint

Measure every outside face of a solid.

HIGH SCHOOL • MA.912.GR.4.6

MA.912.GR.4.6 "Solve mathematical and real-world problems involving the surface area of three-dimensional figures limited to cylinders, pyramids, prisms, cones and spheres."

NAME _____

DATE _____

SURFACE AREA RULES

Surface area is the total area of every outside surface. For a right prism or right cylinder, add the areas of both bases and the lateral faces. For a pyramid or cone, add the base area and lateral area, and for a sphere use $SA = 4\pi r^2$.

WORKED EXAMPLE

Find the surface area of a right rectangular prism with length 11 units, width 12 units, and height 13 units.

1. $SA = 2(lw + lh + wh)$.
2. $SA = 2(11 \cdot 12 + 11 \cdot 13 + 12 \cdot 13)$.
3. $132 + 143 + 156 = 431$.
4. $SA = 2(431) = 862$ square units.

Answer: 862 square units

PRACTICE 6 problems

- 1** Find the total surface area of a right cylinder with radius 4 units and height 9 units.

ANSWER _____

- 2** Find the total surface area of a cone with radius 5 units and slant height 8 units.

ANSWER _____

- 3** Find the total surface area of a regular square pyramid with base side length 6 units and slant height 7 units.

ANSWER _____

- 4** Find the total surface area of a right rectangular prism with dimensions 3 units by 5 units by 8 units.

ANSWER _____

- 5** A right triangular prism has a triangular base with side lengths 6 units, 8 units, and 10 units. The prism length is 4 units. Find its total surface area.

ANSWER _____

- 6** Find the surface area of a sphere with radius 3 units.

ANSWER _____

APPLY IT Show your work

- 1** A portable Bluetooth speaker is shaped like a right cylinder with a radius of 3 cm and a height of 10 cm. Fabric will cover the entire outside, including both circular ends. How much fabric is needed?

WORK SPACE

ANSWER _____

- 2** Student council builds a square-pyramid photo-booth prop. Each base edge is 8 ft, and the slant height of each triangular face is 9 ft. They paint every outside surface, including the square bottom. How many square feet will they paint?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A model rocket is made from a right cylinder with radius 4 in. and height 9 in., topped by a cone with the same radius and a slant height of 6 in. Find its exterior surface area, including the circular bottom of the cylinder but not the circle where the solids meet.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Find the total surface area of a right cylinder with radius 4 units and height 9 units.	104π square units
2	Find the total surface area of a cone with radius 5 units and slant height 8 units.	65π square units
3	Find the total surface area of a regular square pyramid with base side length 6 units and slant height 7 units.	120 square units
4	Find the total surface area of a right rectangular prism with dimensions 3 units by 5 units by 8 units.	158 square units
5	A right triangular prism has a triangular base with side lengths 6 units, 8 units, and 10 units. The prism length is 4 units. Find its total surface area.	144 square units
6	Find the surface area of a sphere with radius 3 units.	36π square units

PART 2 • APPLY IT

- 78π cm²** Use $SA = 2\pi r^2 + 2\pi rh$. Substituting gives $2\pi(3^2) + 2\pi(3)(10) = 78\pi \text{ cm}^2$.
- 208 ft²** The base area is $8 \cdot 8 = 64 \text{ ft}^2$. The lateral area is $\frac{1}{2}(4 \cdot 8)(9) = 144 \text{ ft}^2$, so the total is 208 ft^2 .

CHALLENGE

112π square inches

Accept equivalent exact forms, such as unsimplified sums of π terms. Require square units and do not accept decimal approximations in place of exact π answers.