

شكراً لتحميلك هذا الملف من موقع المناهج الإماراتية



حل أوراق عمل الدرس الخامس مساحة السطح من الوحدة التاسعة -  
منهج ريفيل

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روابط مواد الصف السابع على تلغرام

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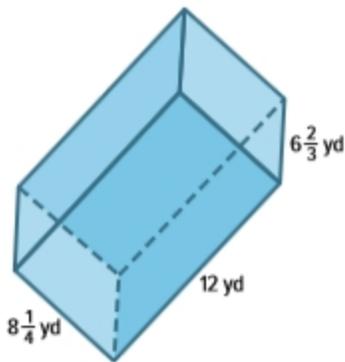
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## 9-5 Surface Area

1. Find the surface area of the prism. Round to the nearest tenth if necessary.



*SOLUTION:*

$$\begin{aligned} S.A. &= 2\ell h + 2\ell w + 2hw \\ &= 2\left(12 \cdot 6\frac{2}{3}\right) + 2\left(12 \cdot 8\frac{1}{4}\right) + 2\left(6\frac{2}{3} \cdot 8\frac{1}{4}\right) \\ &= 160 + 198 + 110 \\ &= 468 \end{aligned}$$

Write the formula.

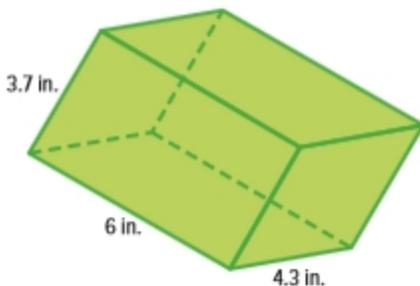
Find the area of each pair of opposite faces.

Simplify.

Add.

So, the total surface area of the prism is 468 square yards.

2. Find the surface area of the prism. Round to the nearest tenth if necessary.



*SOLUTION:*

$$\begin{aligned} S.A. &= 2\ell h + 2\ell w + 2hw \\ &= 2(6 \cdot 3.7) + 2(6 \cdot 4.3) + 2(3.7 \cdot 4.3) \\ &= 44.4 + 51.6 + 31.82 \\ &= 127.82 \\ &= 127.8 \end{aligned}$$

Write the formula.

Find the area of each pair of opposite faces.

Simplify.

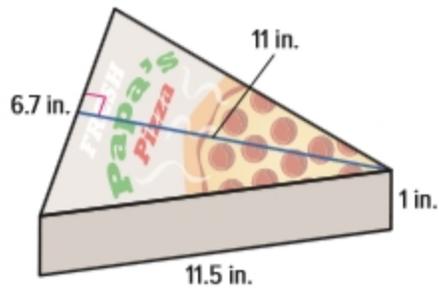
Add.

Round to the nearest tenth.

So, the total surface area of the prism is 127.8 square inches.

## 9-5 Surface Area

3. How much cardboard is needed to make the single slice of pizza box shown?



*SOLUTION:*

In this triangular prism, there are two congruent triangular bases.

**Area Bases:**

$$A = 2\left(\frac{1}{2} \cdot 6.7 \cdot 11\right) \quad \text{There are 2 triangular bases, each with an area } \frac{1}{2} \cdot 6.7 \cdot 11.$$

$$= 2(36.85) \quad \text{Multiply.}$$

$$= 73.7 \quad \text{Multiply.}$$

The combined area of the two triangular bases is 73.7 square inches.

There are three rectangular faces, two of which are congruent.

**Area of Face 1**

$$A = 6.7 \cdot 1 \\ = 6.7 \text{ in}^2$$

**Area of Face 2**

$$A = 11.5 \cdot 1 \\ = 11.5 \text{ in}^2$$

**Area of Face 3**

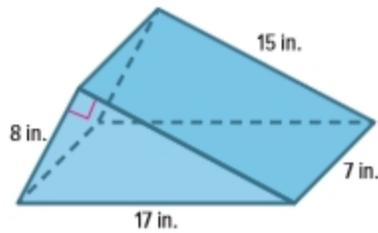
$$A = 11.5 \cdot 1 \\ = 11.5 \text{ in}^2$$

Find the sum of the areas of the faces.

So,  $73.7 + 6.7 + 11.5 + 11.5$  or 103.4 square inches of cardboard.

## 9-5 Surface Area

4. **Open Response** What is the surface area of the triangular prism-shaped toy car ramp shown?



*SOLUTION:*

In this triangular prism, there are two congruent triangular bases.

**Area Bases:**

$$A = 2\left(\frac{1}{2} \cdot 8 \cdot 15\right) \quad \text{There are 2 triangular bases, each with an area } \frac{1}{2} \cdot 8 \cdot 15.$$

$$= 2(60) \quad \text{Multiply.}$$

$$= 120 \quad \text{Multiply.}$$

The combined area of the two triangular bases is 120 square inches.

There are three rectangular faces.

**Area of Face 1**

$$A = 8 \cdot 7 \\ = 56 \text{ in}^2$$

**Area of Face 2**

$$A = 17 \cdot 7 \\ = 119 \text{ in}^2$$

**Area of Face 3**

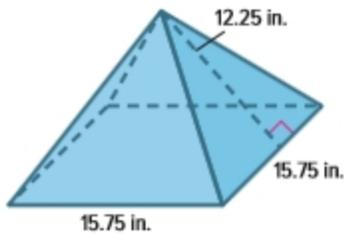
$$A = 15 \cdot 7 \\ = 105 \text{ in}^2$$

Find the sum of the areas of the faces.

So,  $120 + 56 + 119 + 105$  or 400 square inches of cardboard.

## 9-5 Surface Area

5. Find the surface area of the pyramid. Round to the nearest tenth if necessary.



*SOLUTION:*

Find the area of the base.

$$\begin{aligned} A &= s^2 && \text{Area of a square} \\ &= 15.75 \cdot 15.75 && \text{Each side is 15.75.} \\ &= 248.0625 && \text{Multiply.} \end{aligned}$$

The area of the base is 248.0625 square inches.

Find the area of the 4 lateral faces.

$$\begin{aligned} A &= 4\left(\frac{1}{2}bh\right) && \text{There are 4 lateral faces with an area of } \frac{1}{2}bh. \\ &= 4\left(\frac{1}{2} \cdot 15.75 \cdot 12.25\right) && \text{Replace } b \text{ with 15.75 and } h \text{ with 12.25.} \\ &= 4(96.46875) && \text{Multiply.} \\ &= 385.875 && \text{Multiply.} \end{aligned}$$

The area of the lateral faces is 385.875 square inches.

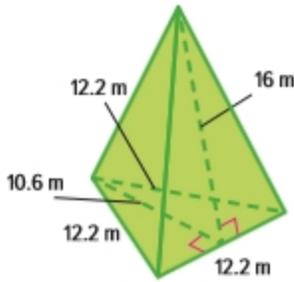
Find the total surface area of the pyramid.

$$\begin{aligned} 248.0625 + 385.875 &= 633.9375 \\ &= 633.9 && \text{Round to the nearest tenth.} \end{aligned}$$

The total surface area of the pyramid is 633.9 square inches.

## 9-5 Surface Area

6. Find the surface area of the pyramid. Round to the nearest tenth if necessary.



*SOLUTION:*

Find the area of the base.

$$\begin{aligned} A &= \frac{1}{2}bh && \text{Area of a triangle} \\ &= \frac{1}{2} \cdot 12.2 \cdot 10.6 && \text{Replace } b \text{ with } 12.2 \text{ and } h \text{ with } 10.6. \\ &= 64.66 && \text{Multiply.} \end{aligned}$$

The area of the base is 64.66 square meters.

Find the area of the 3 lateral faces.

$$\begin{aligned} A &= 3\left(\frac{1}{2}bh\right) && \text{There are 3 lateral faces with an area of } \frac{1}{2}bh. \\ &= 3\left(\frac{1}{2} \cdot 12.2 \cdot 16\right) && \text{Replace } b \text{ with } 12.2 \text{ and } h \text{ with } 16. \\ &= 3(97.6) && \text{Multiply.} \\ &= 292.8 && \text{Add.} \end{aligned}$$

The area of the lateral faces is 292.8 square meters.

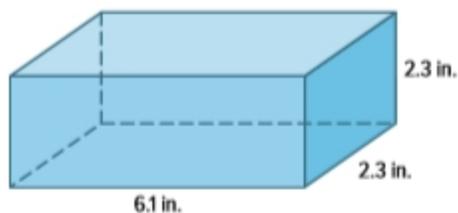
Find the total surface area.

$$\begin{aligned} 64.66 + 292.8 &= 357.46 \\ &= 357.5 && \text{Round to the nearest tenth.} \end{aligned}$$

The total surface area of the pyramid is 357.5 square meters.

## 9-5 Surface Area

7. Oscar is making a play block for his baby sister by gluing fabric over the entire surface of a foam block. Is 65 square inches of fabric enough? If so, how much fabric will remain? If not, how much more fabric will he need?



*SOLUTION:*

Find the total surface area of the rectangular prism.

$$S.A. = 2\ell h + 2\ell w + 2hw$$

Write the formula.

$$= 2(6.1 \cdot 2.3) + 2(6.1 \cdot 2.3) + 2(2.3 \cdot 2.3)$$

Find the area of each pair of opposite faces.

$$= 28.06 + 28.06 + 10.58$$

Simplify.

$$= 66.7$$

Add.

So, the total surface area of the block is 66.7 square inches.

Because  $66.7 > 65$  he does not have enough fabric. He would need an additional  $66.7 - 65$  or 1.7 square inches of fabric.

8. When wrapping a birthday gift in the shape of a rectangular prism for his mother, Kenji adds an additional 2.5 square feet of gift wrap to allow for overlap. How many square feet of gift wrap will Kenji use to wrap a gift 3.5 feet long, 18 inches wide, and 2 feet high?

*SOLUTION:*

First convert 18 inches to feet. There are 12 inches in 1 foot.

$$18 \div 12 = 1.5$$

So, 18 inches = 1.5 feet.

Find the total surface area of the present.

$$S.A. = 2\ell h + 2\ell w + 2hw$$

Write the formula.

$$= 2(3.5 \cdot 2) + 2(3.5 \cdot 1.5) + 2(2 \cdot 1.5)$$

Find the area of each pair of opposite faces.

$$= 14 + 10.5 + 6$$

Simplify.

$$= 30.5$$

Add.

So, the total surface area of the present is 30.5 square feet.

The total amount of gift wrap is  $30.5 + 2.5$  or 33 square feet of gift wrap.

## 9-5 Surface Area

9. Find the surface area of a rectangular prism with a height of  $4\frac{1}{3}$  yards, a length of 6.2 yards, and a width of 3.15 yards.

*SOLUTION:*

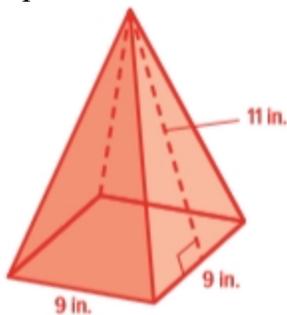
$$\begin{aligned} S.A. &= 2(6.2 \cdot 4\frac{1}{3}) + 2(6.2 \cdot 3.15) + 2(4\frac{1}{3} \cdot 3.15) \\ &= 53\frac{1}{3} + 39.06 + 27.03 \\ &= 120\frac{7}{75} \text{ or about } 120.09 \end{aligned}$$

The surface area of the rectangular prism is  $120\frac{7}{75}$  yd<sup>2</sup> or about 120.09 yd<sup>2</sup>.

10. Draw and label a square pyramid with a surface area between 200 and 300 square inches. Include the surface area.

*SOLUTION:*

Sample answer:



The area of the base is  $9 \times 9$  or  $81 \text{ in}^2$ . The area of the 3 faces is  $4(0.5 \times 9 \times 11)$  or  $198 \text{ in}^2$ . The total surface area is  $81 + 198$  or  $279 \text{ in}^2$  and  $200 < 279 < 300$ .

11. **Reason Abstractly** The side measures of a rectangular prism are tripled. What is the relationship between the surface area of the original prism and the surface area of the new prism? Support your answer with an example.

*SOLUTION:*

The surface area of the original prism is  $\frac{1}{9}$  the surface area of the new prism.

Sample answer: If the original prism has a length of 4 m, a width of 3 m, and a height of 2 m, the *S.A.* of the prism is  $52 \text{ m}^2$ . The new prism would have a length of 12 m, a width of 9 m, and a height of 6 m. The *S.A.* is  $468 \text{ m}^2$ .

$$\frac{52}{468} = \frac{1}{9}$$

## **9-5 Surface Area**

12. **Create** Write and solve a real-world problem where you have to find the surface area of a rectangular prism.

*SOLUTION:*

Sample answer: A packaging company needs to know how much cardboard will be required to make boxes 18 inches long, 12 inches wide, and 10 inches high. How much cardboard will be needed for each rectangular prism-shaped box if there is no overlap in the construction?

Find the surface area.

$$\begin{aligned} S.A &= 2(18 \cdot 10) + 2(18 \cdot 12) + 2(10 \cdot 12) \\ &= 1,032 \end{aligned}$$

The surfaces area is 1,032 in<sup>2</sup>.