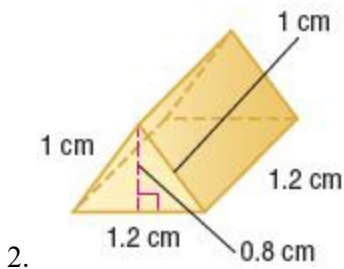


10-4 Surface Area of Triangular Prisms

Find the surface area of the triangular prism.



SOLUTION:

area of each triangular base: $\frac{1}{2}(1.2)(0.8) = 0.48$
area of the rectangular faces: $1(1.2) = 1.2$
 $1(1.2) = 1.2$
 $1.2(1.2) = 1.44$

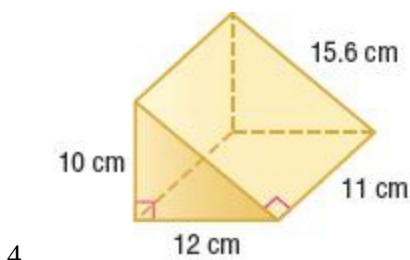
Add to find the surface area:

$$0.48 + 0.48 + 1.2 + 1.2 + 1.44 = 4.8$$

The surface area is 4.8 square centimeters.

ANSWER:

$$4.8 \text{ cm}^2$$



SOLUTION:

area of each triangular base: $\frac{1}{2}(12)(10) = 60$
area of the rectangular faces: $12(11) = 132$
 $10(11) = 110$
 $15.6(11) = 171.6$

Add to find the surface area:

$$60 + 60 + 132 + 110 + 171.6 = 533.6$$

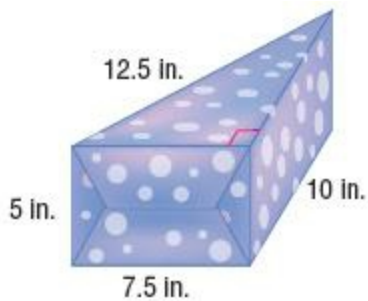
The surface area is 533.6 square centimeters.

ANSWER:

$$533.6 \text{ cm}^2$$

10-4 Surface Area of Triangular Prisms

6. A decorative gift box is in the shape of a triangular prism as shown. What is the surface area of the box?



SOLUTION:

$$\text{area of each triangular base: } \frac{1}{2}(7.5)(10) = 37.5$$

$$\text{area of the rectangular faces: } 7.5(5) = 37.5$$

$$10(5) = 50$$

$$12.5(5) = 62.5$$

Add to find the surface area.

$$37.5 + 37.5 + 37.5 + 50 + 62.5 = 225$$

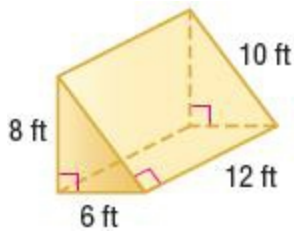
The surface area is 225 square inches.

ANSWER:

$$225 \text{ in}^2$$

10-4 Surface Area of Triangular Prisms

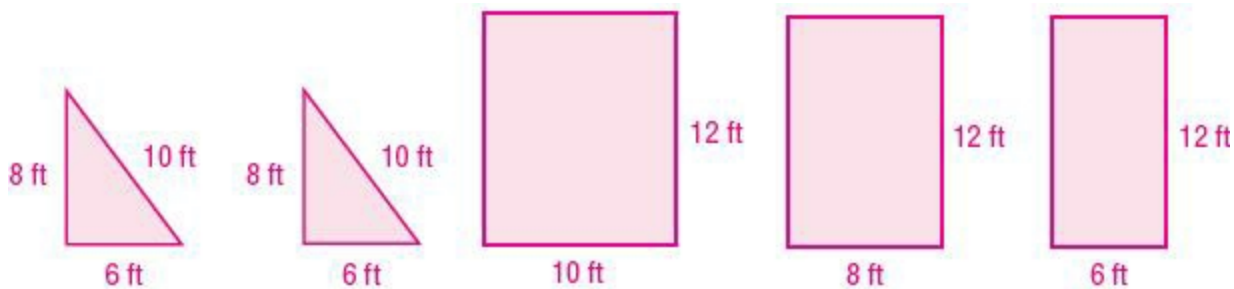
8. **Multiple Representations** The figure shows the dimensions of a triangular prism.



- Models** Draw a model of the faces and bases of the triangular prism.
- Words** Describe the triangular prism.
- Numbers** Find the surface area of the triangular prism using addition.

SOLUTION:

a.

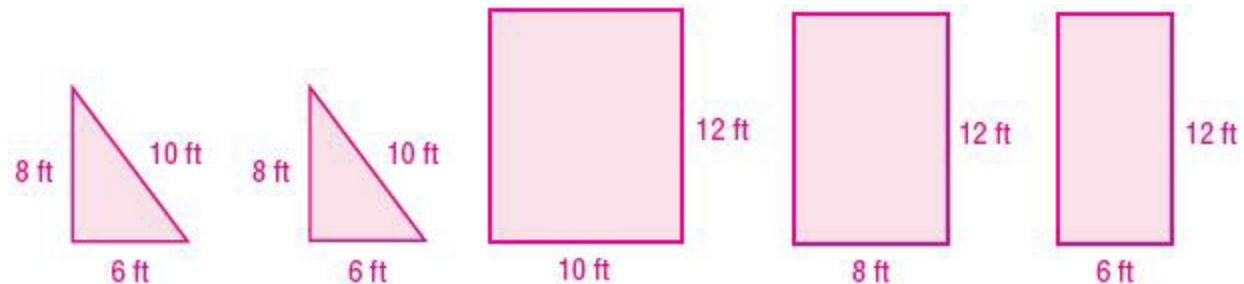


- Sample answer: The prism has right triangle bases each with an area of 24 ft^2 . The rectangular faces have an area of 72 ft^2 , 120 ft^2 , and 96 ft^2 . The total surface area is 336 ft^2 .

c. $24 + 24 + 72 + 120 + 96 = 336$; 336 ft^2

ANSWER:

a.



- Sample answer: The prism has right triangle bases each with an area of 24 ft^2 . The rectangular faces have an area of 72 ft^2 , 120 ft^2 , and 96 ft^2 . The total surface area is 336 ft^2 .

c. $24 + 24 + 72 + 120 + 96 = 336$; 336 ft^2

10-4 Surface Area of Triangular Prisms

10. **Reason Abstractly** Describe the dimensions of a triangular prism that has a surface area between 550 square inches and 700 square inches.

SOLUTION:

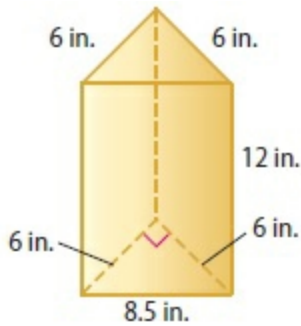
Sample answer: triangular base that measures 9 inches, 12 inches, and 15 inches, and a height of 14 inches

ANSWER:

Sample answer: triangular base that measures 9 inches, 12 inches, and 15 inches, and a height of 14 inches

10-4 Surface Area of Triangular Prisms

12. **Justify Conclusions** Gary is painting a decorative box with the dimensions shown. A can of paint covers about 25 square feet. Does he have enough to paint the lateral surface area of his box with three coats of paint? Justify your answer.



SOLUTION:

Find the lateral surface area.

front rectangle

$$A = l \cdot w$$

$$A = 8.5 \cdot 12$$

$$A = 102$$

So the area of the front rectangle is 102 in^2

Side rectangle

$$A = l \cdot w$$

$$A = 6 \cdot 12$$

$$A = 72$$

The area of each side rectangle is 72 in^2

To find the lateral surface area, find the sum of the areas of all three sides.

$$102 + 72 + 72 = 246 \text{ in}^2$$

1 square foot = 144 square inches

To convert 244 square inches to square feet, divide by 144

$$\frac{244}{144} = 1.7$$

The lateral surface area of the box is 1.7 ft^2 .

If you were going to paint the area three times, multiply the lateral surface area by three to determine the amount of paint needed.

$$1.7 \times 3 = 5.1$$

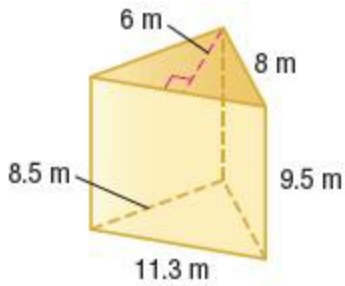
Three coats would need to cover 5.1 ft^2 , which is much less than the 25 ft^2 .

ANSWER:

yes; Sample answer: The area of the rectangular faces is about 1.7 ft^2 . Three coats would need to cover 5.1 ft^2 , which is much less than the 25 ft^2 .

10-4 Surface Area of Triangular Prisms

Be Precise Find the surface area of each triangular prism. Round to the nearest tenth if necessary.



14.

SOLUTION:

$$\text{area of each base: } \frac{1}{2} \cdot 11.3 \cdot 6 = 33.9 \text{ m}^2$$

$$\text{areas of faces: } 11.3 \cdot 9.5 = 107.35 \text{ m}^2$$

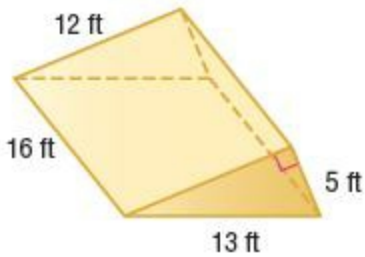
$$8.5 \cdot 9.5 = 80.75 \text{ m}^2$$

$$8 \cdot 9.5 = 76 \text{ m}^2$$

$$\text{surface area} = 33.9 + 33.9 + 107.35 + 80.75 + 76 \text{ or } 331.9 \text{ m}^2$$

ANSWER:

$$331.9 \text{ m}^2$$



16.

SOLUTION:

$$\text{area of each triangular base: } \frac{1}{2} \cdot 5 \cdot 12 = 30$$

$$\text{area of the rectangular faces: } 5(16) = 80$$

$$12(16) = 192$$

$$13(16) = 208$$

Add to find the surface area:

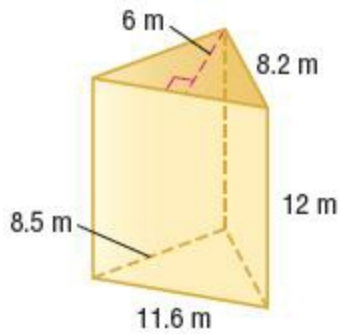
$$30 + 30 + 80 + 192 + 208 = 540$$

The surface area is 540 square feet.

ANSWER:

$$540 \text{ ft}^2$$

10-4 Surface Area of Triangular Prisms



18.

SOLUTION:

$$\text{area of each triangular base: } \frac{1}{2} \cdot 11.6 \cdot 6 = 34.8$$

$$\text{area of the rectangular faces: } 8.2(12) = 98.4$$

$$8.5(12) = 102$$

$$11.6(12) = 139.2$$

Add to find the surface area.

$$34.8 + 34.8 + 98.4 + 102 + 139.2 = 409.2$$

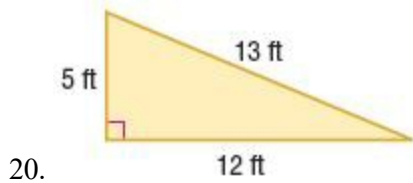
The surface area of the prism is 409.2 square meters.

ANSWER:

$$409.2 \text{ m}^2$$

10-4 Surface Area of Triangular Prisms

Copy and Solve Find the surface area of the triangular prism using the base triangles shown. Show your work on a separate piece of paper.



height of prism: 15 ft

SOLUTION:

$$\text{area of each triangular base: } \frac{1}{2} \cdot 12 \cdot 5 = 30$$

$$\text{area of the rectangular faces: } 5(15) = 75$$

$$12(15) = 180$$

$$13(15) = 195$$

Add to find the surface area.

$$30 + 30 + 75 + 180 + 195 = 510$$

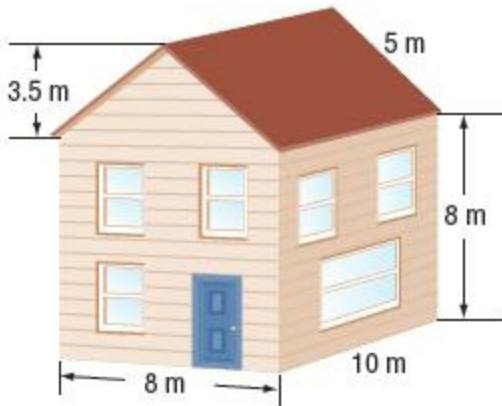
The surface area is 510 square feet.

ANSWER:

$$510 \text{ ft}^2$$

10-4 Surface Area of Triangular Prisms

22. The attic of the house is a wooden surface.



Select values to complete the model below to find how much wood is needed to make the roof of the house and the floor of the attic.

2	8	50
3.5	10	80
5	14	100

Attic Floor: × = m²

Roof: × × = m²

How many square meters of wood are needed to build the roof and the floor of the attic?

SOLUTION:

Attic Floor: × = m²

Roof: × × = m²

The total amount of wood needed is 100 + 80 or 180 square meters. .

ANSWER:

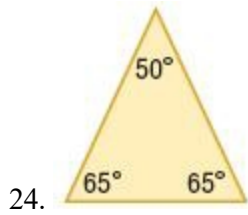
Attic Floor: × = m²

Roof: × × = m²

The total amount of wood needed is 100 + 80 or 180 square meters. .

10-4 Surface Area of Triangular Prisms

Identify the triangle as *acute*, *right*, or *obtuse*.



SOLUTION:

All angles of the triangle are acute, so it is an acute triangle.

ANSWER:

acute

26. A certain two-dimensional figure has two pairs of parallel lines, four right angles, and four congruent sides. What is the figure?

SOLUTION:

The only quadrilateral that has two pairs of parallel lines, four right angles, and four congruent sides is a square.

ANSWER:

square