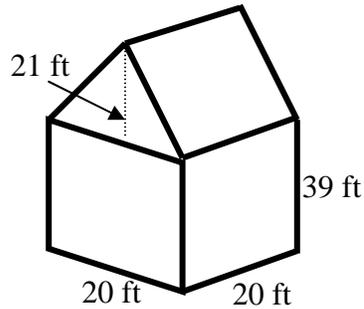


Prisms: Areas and Volume

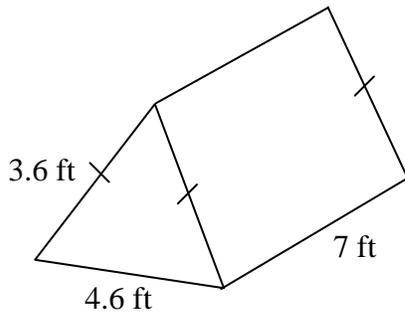
Determining Surface Area and Volume of Prisms: Worksheet A

1. The heating system for the building shown below can raise the temperature 12°F at a rate of 144 cubic feet per minute. At this rate, how many minutes will it take to raise the temperature of the entire building 12° ?



	/	/	/	
.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

2. Suppose a tent in the shape of an isosceles triangular prism is resting on a flat surface. What is the surface area, in square feet, of the entire tent?



	/	/	/	
.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

3. A cubic foot of ocean water contains about 1.5 pounds of salt. An aquarium is filled with ocean water. What is the weight, in pounds, of salt in the aquarium if the aquarium is a rectangular prism measuring 10 feet by 8 feet by 6 feet?

	/	/	/	
.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Prisms: Areas and Volume

Determining Surface Area and Volume of Prisms: Worksheet A (Cont.)

- 4a. Farmer Brown has a silo to store grain that is in the shape of a cylinder. The surface area of this silo is approximately 320π and the radius is 8 feet. What is the height, in feet, of his silo?

	/	/	/	
.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

- 4b. Farmer Jones wants to build a silo to be the same volume as Farmer Brown's (see problem 4a), but half its height. What must be the diameter, in feet, of Farmer Jones' silo in order to meet these conditions?

	/	/	/	
.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

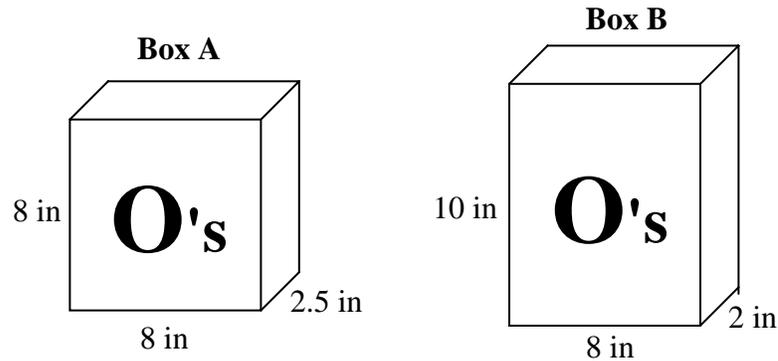
5. A straw is 24 cm long and 4 mm in diameter. How much liquid, in cubic mm, can the straw hold?

	/	/	/	
.
0	0	0	0	0
1	1	1	1	1
2	2	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
7	7	7	7	7
8	8	8	8	8
9	9	9	9	9

Prisms: Areas and Volume

Determining Surface Area and Volume of Prisms: Worksheet A (Cont.)

6. General Moles Cereal Company is choosing between two box designs with dimensions shown below. The company would like to keep the amount of cardboard used for the box to a minimum because it is better for the environment. The company must choose between two box designs.



Note: The figures are not drawn to scale.

Which box uses less cardboard? Use mathematics to justify your answer.

Prisms: Areas and Volume

Worksheet A Answers:

1. Rectangular prism: $V = l \cdot w \cdot h = 20 \cdot 20 \cdot 39$
 $= 15,600 \text{ ft}^3$

Triangular prism: $V = Bh = \frac{1}{2} \cdot 20 \cdot 21 \cdot 20$
 $= 4,200 \text{ ft}^3$

Total volume is $15,600 + 4,200 = 19,800 \text{ ft}^3$

$19,800 \div 144 = 137.5$

2. $SA = 2 \left(\frac{1}{2}bh \right) + P \cdot w = 2 \left(\frac{1}{2}(4.6)(2.77) \right) + 11.8 \cdot 7$
 $= 95.34$

$$h = \sqrt{\left((3.6)^2 - (2.3)^2 \right)} \approx 2.77$$

3. $V = 10 \cdot 8 \cdot 6 = 480$

$$480 \cdot 1.5 = 720$$

4a. $SA = 2B + Ch = 2(8^2 \cdot \pi) + (2 \cdot 8 \cdot \pi)h = 320\pi$
 $320\pi - 128\pi = 16\pi h$
 $12 = h$

4b. $V = \pi \cdot 8^2 \cdot 12 = \pi \cdot r^2 \cdot 6$

$$768\pi = 6\pi r^2$$

$$11.3 = r \quad \text{Therefore } d = 22.6$$

5. $V = \pi r^2 h = \pi \cdot 2^2 \cdot 240 = 960\pi \approx 3016$

6. $SA(A) = 2lw + 2hw + 2lh$
 $= 2(8)(2.5) + 2(8)(2.5) + 2(8)(8)$
 $= 208 \text{ in}^2$

$$SA(B) = 2lw + 2hw + 2lh$$
$$= 2(8)(2) + 2(10)(2) + 2(8)(10)$$
$$= 232 \text{ in}^2$$

Box A has the least surface area and uses less cardboard.