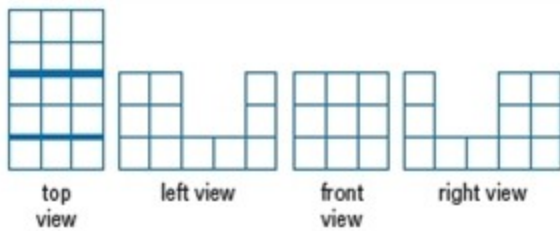


## Practice Test - Chapter 12

1. Use isometric dot paper and the orthographic drawings to sketch the solid.



### SOLUTION:

top view: There are 3 rows and 6 columns. The dark segments indicate changes in depth at the 2nd and 3rd columns.

left view: The figure is 3 units high in the 1st, 5th, and 6th columns. The figure is 1 unit high at the 2nd and 3rd columns.

right view: The figure is 3 units high in the 1st, 5th, and 6th columns. The figure is 1 unit high at the 2nd and 3rd columns.

Connect the dots on the isometric dot paper to represent the edges of the solid. Shade the tops of each column.



### ANSWER:



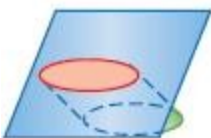
## Practice Test - Chapter 12

2. Describe the cross section.



**SOLUTION:**

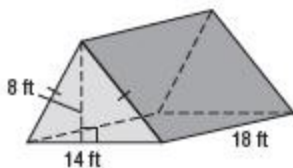
The plane cutting the oblique cylinder at an angle divides the cylinder into two parts with a cross section in the shape of an ellipse.



**ANSWER:**

ellipse

3. Find the surface area of the tent model. Round to the nearest tenth if necessary.



**SOLUTION:**

The base of the prism is an isosceles triangle. Use the Pythagorean Theorem to find the length of the congruent sides.

$$a^2 + b^2 = c^2$$

$$7^2 + 8^2 = c^2$$

$$49 + 64 = c^2$$

$$\sqrt{113} = c$$

Use this value to find the lateral and surface area.

$$S = Ph + 2B$$

$$= (14 + \sqrt{113} + \sqrt{113})(18) + 2\left[\frac{1}{2}(8)(14)\right]$$

$$= 252 + 36\sqrt{113} + 112$$

$$\approx 746.7$$

**ANSWER:**

$$746.7 \text{ ft}^2$$

## Practice Test - Chapter 12

4. **CANDLES** A circular pillar candle is 2.8 inches wide and 6 inches tall. What are the lateral area and surface area of the candle? Round to the nearest tenth if necessary.

**SOLUTION:**

$$\begin{aligned}L &= 2\pi rh \\ &= 2\pi(1.4)(6) \\ &= 16.8\pi \\ &\approx 52.8\end{aligned}$$

$$\begin{aligned}S &= 2\pi rh + 2B \\ &= 2\pi(1.4)(6) + 2\pi(1.4)^2 \\ &= 16.8\pi + 3.92\pi \\ &= 20.72\pi \\ &\approx 65.1\end{aligned}$$

**ANSWER:**

$$52.8 \text{ in}^2, 65.1 \text{ in}^2$$

5. **TEA** A tea bag is shaped like a regular square pyramid. Each leg of the base is 4 centimeters, and the slant height is 5 centimeters. What is the surface area of the tea bag in square centimeters? Round to the nearest tenth if necessary.

**SOLUTION:**

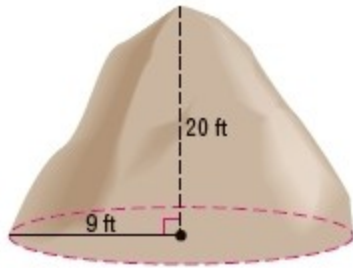
$$\begin{aligned}S &= L + B \\ &= \frac{1}{2}Pl + s^2 \\ &= \frac{1}{2}[(4)(4)](5) + 4^2 \\ &= 40 + 16 \\ &= 56\end{aligned}$$

**ANSWER:**

$$56$$

## Practice Test - Chapter 12

6. **BEEHIVE** Estimate the lateral area and surface area of the Turkish beehive room. Round to the nearest tenth if necessary.



**SOLUTION:**

Use the Pythagorean Theorem to find the slant height.

$$l^2 = 20^2 + 9^2$$

$$= 400 + 81$$

$$= 481$$

$$l = \sqrt{481}$$

Find the lateral area  $L$ .

$$L = \pi r l$$

$$= \pi(9)(\sqrt{481})$$

$$\approx 620.1$$

The lateral area of the room is about 620.1 square feet.

$$\text{Surface area}(S) = \pi r l + \pi r^2$$

$$= \pi(9)(\sqrt{481}) + \pi(9)^2$$

$$\approx 874.6$$

The surface area of the room is about 874.6 square feet.

**ANSWER:**

$$620.1 \text{ ft}^2, 874.6 \text{ ft}^2$$

7. A circular pillar candle is 2.8 inches wide and 6 inches tall.

Find the volume of the candle. Round to the nearest tenth if necessary.

**SOLUTION:**

The volume  $V$  of a right prism is  $V = Bh$ , where  $h$  is the height of the prism and  $B$  is the area of a base. The radius of the base is 1.4 in and the height of the cylinder is 6 in. The volume is  $\pi(1.4)^2(6) \approx 36.9 \text{ in}^3$ .

**ANSWER:**

$$36.9 \text{ in}^3$$

## Practice Test - Chapter 12

8. A tea bag is shaped like a regular square pyramid. Each leg of the base is 4 centimeters, and the slant height is 5 centimeters.

Find the volume of the tea bag. Round to the nearest tenth if necessary.

**SOLUTION:**

The volume of a pyramid is  $V = \frac{1}{3}Bh$ , where  $B$  is the area of the base and  $h$  is the height of the pyramid. Use the Pythagorean Theorem to find the height of the pyramid.

$$\begin{aligned}h &= \sqrt{5^2 - 2^2} \\ &= \sqrt{21} \\ &\approx 4.6\end{aligned}$$

Find the volume.

$$\begin{aligned}V &= \frac{1}{3}Bh \\ &= \frac{1}{3}(4 \times 4)(4.6) \\ &\approx 24.5 \text{ cm}^3\end{aligned}$$

**ANSWER:**

$$24.5 \text{ cm}^3$$

## Practice Test - Chapter 12

9. **EARTH** Earth's radius is approximately 6400 kilometers. What are the surface area and volume of the Earth? Round to the nearest tenth if necessary.



**SOLUTION:**

The surface area  $S$  of a sphere is  $S = 4\pi r^2$ , where  $r$  is the radius.

$$\begin{aligned} S &= 4\pi(6400)^2 \\ &\approx 514,718,540 \text{ km}^2 \end{aligned}$$

The volume  $V$  of a sphere is  $V = \frac{4}{3}\pi r^3$ , where  $r$  is the radius.

$$\begin{aligned} V &= \frac{4}{3}\pi(6400)^3 \\ &\approx 1,098,066,219,443.5 \text{ km}^3 \end{aligned}$$

**ANSWER:**

$$514,718,540.4 \text{ km}^2, 1,098,066,219,443.5 \text{ km}^3$$

10. **SOFTBALL** A regulation softball has a circumference of 12 inches. What is the volume of the softball?

**SOLUTION:**

The circumference of a great circle is  $2\pi r$ .

$$2\pi r = 12$$

$$r \approx 1.9098593$$

The volume  $V$  of a sphere is  $V = \frac{4}{3}\pi r^3$ , where  $r$  is the radius.

$$\begin{aligned} V &= \frac{4}{3}\pi(1.9098593)^3 \\ &\approx 29.2 \text{ in}^3 \end{aligned}$$

**ANSWER:**

$$29.2 \text{ in}^3$$

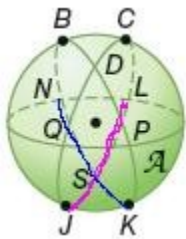
**Practice Test - Chapter 12**

Name each of the following on sphere  $A$ .



11. two lines containing point  $S$

**SOLUTION:**



$\overline{JL}$  and  $\overline{KN}$  are lines on sphere  $A$  that contain point  $S$ .

**ANSWER:**

$\overline{JL}, \overline{KN}$

12. a segment containing point  $L$

**SOLUTION:**



$\overline{CS}$  is a segment on sphere  $A$  that contains point  $L$ .

**ANSWER:**

$\overline{CS}$

**Practice Test - Chapter 12**

13. a triangle

SOLUTION:



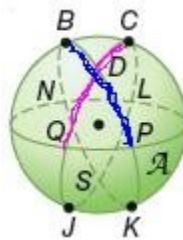
$\triangle DQP$

ANSWER:

$\triangle DQP$

14. two lines containing point  $D$

SOLUTION:



$\overline{QC}$  and  $\overline{BP}$  are lines on sphere  $A$  that contain point  $D$ .

ANSWER:

$\overline{QC}, \overline{BP}$

15. a segment containing point  $P$

SOLUTION:



$\overline{DK}$  is a segment on sphere  $A$  that contains point  $P$ .

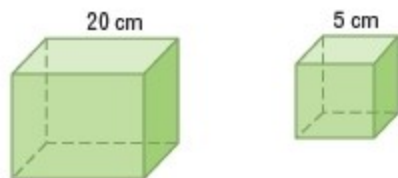
ANSWER:

$\overline{DK}$



## Practice Test - Chapter 12

16. Are these two cubes *similar*, *congruent*, or *neither*? Explain your reasoning.



**SOLUTION:**

Similar; all of the sides are not equal so the cubes are not congruent. The ratio of the larger cube's side to the smaller cube's side is always 4, so they are similar.

Note: All cubes are similar. All spheres are also similar.

**ANSWER:**

Similar; all of the sides are not equal so the cubes are not congruent. The ratio of the larger cube's side to the smaller cube's side is always 4, so they are similar.

17. Two similar cylinders have heights of 75 centimeters and 25 centimeters. What is the ratio of the volume of the large cylinder to the volume of the small cylinder?

**SOLUTION:**

Find the scale factor.

$$\frac{\text{height of large cylinder}}{\text{height of small cylinder}} = \frac{75}{25} = \frac{3}{1}$$

The scale factor is  $\frac{3}{1}$ .

If the scale factor is  $\frac{a}{b}$ , then the ratio of volumes is  $\frac{a^3}{b^3}$ .

$$\frac{3}{1} = \frac{3^3}{1^3} = \frac{27}{1}$$

So, the ratio of the volumes is 27:1.

**ANSWER:**

27:1

## Practice Test - Chapter 12

18. **BAKING** Two spherical pieces of cookie dough have radii of 3 centimeters and 5 centimeters, respectively. The pieces are combined to form one large spherical piece of dough. What is the approximate radius of the new sphere of dough? Round to the nearest tenth.

**SOLUTION:**

$$V(\text{new}) = V(\text{1stpiece}) + V(\text{2ndpiece})$$

$$\begin{aligned} V(\text{new}) &= \frac{4}{3}\pi(5)^3 + \frac{4}{3}\pi(3)^3 \\ &= \frac{4}{3}\pi(125 + 27) \\ &= \frac{4}{3}\pi(152) \end{aligned}$$

Find the radius of the new piece.

$$V = \frac{4}{3}\pi(152)$$

$$\frac{4}{3}\pi r^3 = \frac{4}{3}\pi(152)$$

$$r^3 = 152$$

$$r \approx 5.3$$

**ANSWER:**

5.3 cm

19. **ALGEBRA** A rectangular prism has a base with side lengths  $x$  and  $x + 3$  and height  $2x$ . Find the surface area and volume of the prism.

**SOLUTION:**

$$S = Ph + B$$

$$= 2(x + x + 3)(2x) + 2(x)(x + 3)$$

$$= 2(2x + 3)(2x) + 2(x^2 + 3x)$$

$$= 8x^2 + 12x + 2x^2 + 6x$$

$$= 10x^2 + 18x$$

$$V = Bh$$

$$= (x)(x + 3)(2x)$$

$$= 2x^3 + 6x^2$$

**ANSWER:**

$$10x^2 + 18x; 2x^3 + 6x^2$$

## Practice Test - Chapter 12

20. **TRANSPORTATION** The traffic cone is 19 inches tall and has a radius of 5 inches.



- Find the lateral area.
- Find the surface area.

**SOLUTION:**

Find  $l$ .

$$a^2 + b^2 = c^2$$

$$19^2 + 5^2 = c^2$$

$$361 + 25 = c^2$$

$$\sqrt{386} = c$$

Now find the lateral and surface area.

$$\begin{aligned} L &= \pi r l \\ &= \pi(5)(\sqrt{386}) \\ &\approx 308.6 \end{aligned}$$

$$\begin{aligned} S &= L + B \\ &= \pi r l + \pi r^2 \\ &= \pi(5)(\sqrt{386}) + \pi(5)^2 \\ &\approx 387.2 \end{aligned}$$

**ANSWER:**

- $308.6 \text{ in}^2$
- $387.2 \text{ in}^2$