Name: _____   Date _____
CC Geometry

Volume Test Review

1) The bases of a prism are *always*

   A) rectangles   C) perpendicular
   B) parallel   D) intersecting

2) Which geometric solid has only one base?

   A) a pyramid   C) a triangle
   B) a prism   D) a cube

3) The cross section of a regular pyramid contains the altitude of the pyramid. The shape of this cross section is a

   A) triangle   C) circle
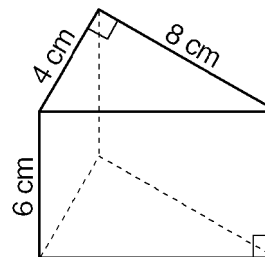   B) rectangle   D) square

4) Triangle ABC represents a metal flag on pole *AD*, as shown in the accompanying diagram. On a windy day the triangle spins around the pole so fast that it looks like a three-dimensional shape.
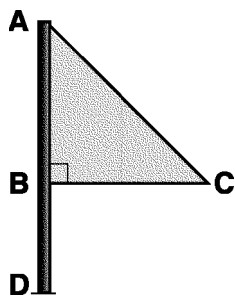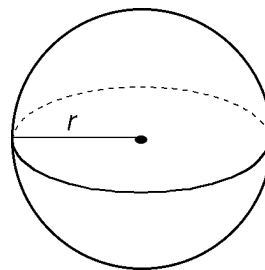

   Which shape would the spinning flag create?

   A) pyramid
   B) sphere
   C) cone
   D) right circular cylinder

5) What is the volume of the following prism?

   A) 96 cm^3 C) 80 cm^3
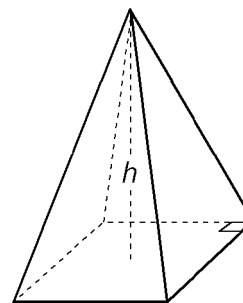   B) 72 cm^3 D) 84 cm^3

6)

   What is the volume of the sphere shown, to the *nearest* tenth of a cubic inch, if the radius (*r*) equals 7 inches?
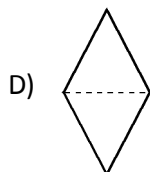
   A) 615.8 in.^{3} C) 2,212.4 in.^{3}
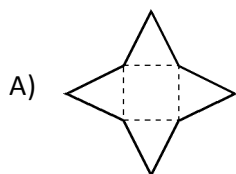   B) 1,436.8 in.^{3} D) 3,603.8 in.^{3}

7) If the area of the base of the square pyramid below is 96 ft^2 and the height is 8 ft, what is the volume?

   A) 192 ft^3 C) 384 ft^3
   B) 768 ft^3 D) 256 ft^3

8) Which piece of paper can be folded into a pyramid?

A)

C)

B)

D)
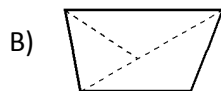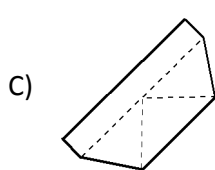
9) The density of the American white oak tree is 752 kilograms per cubic meter. If the trunk of an American white oak tree has a circumference of 4.5 meters and the height of the trunk is 8 meters, what is the approximate number of kilograms of the trunk?

A) 13,536

C) 13

B) 9,694

D) 30,456

10) A fish tank in the shape of a rectangular prism has dimensions of 14 inches, 16 inches, and 10 inches. The tank contains 1,680 cubic inches of water. What percent of the fish tank is empty?

A) 50

C) 10

B) 75

D) 25

11) A right circular cylinder is circumscribed about a sphere whose radius is 3 inches. The number of cubic inches in the volume of the cylinder is

A) 36π

C) 18π

B) 54π

D) 108π

12) Which figure can have the same cross section as a sphere?

A)

B)

C)

D)
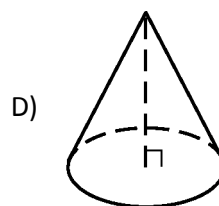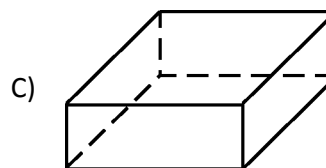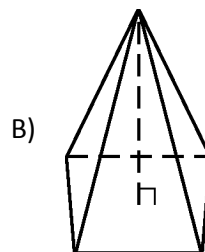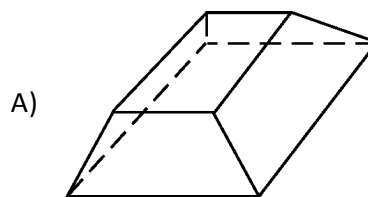
13) Which object is formed when right triangle RST shown below is rotated around leg $\overline{RS}$?
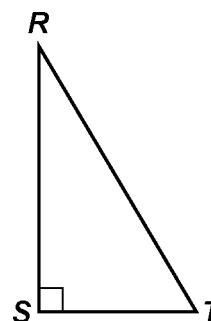
A) a right triangle

B) a pyramid with a square base

C) a cone

D) an isosceles triangle

14) The Great Pyramid of Giza was constructed as a regular pyramid with a square base. It was built with an approximate volume of 2,592,276 cubic meters and a height of 146.5 meters. What was the length of one side of its base, to the nearest meter?

A) 73   C) 133

B) 230   D) 77

15) The volume of a cube is 3,375 cubic inches. What is the measure of each side of the cube?

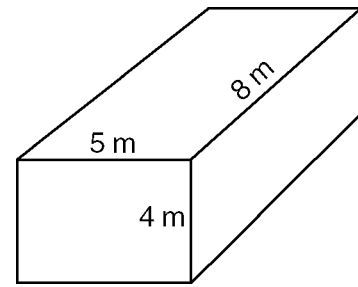A) 15 in.   C) 1,125 in.

B) 125 in.   D) 562.5 in.

16) What is the volume of the following prism?

A) $160 \, m^3$ C) $180 \, m^3$

B) $200 \, m^3$ D) $120 \, m^3$

17) A hemispherical water tank has an inside diameter of 10 feet. If water has a density of 62.4 pounds per cubic foot, what is the weight of the water in a full tank, to the nearest pound?

A) 261,381   C) 32,673

B) 130,690   D) 16,336

18) The attic of a building shown below is in the shape of a half cylinder. The diameter is 40 feet and its length is 56 feet.
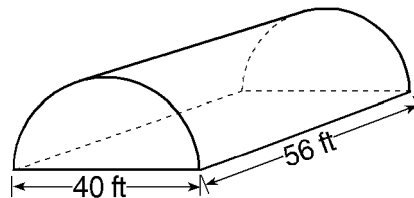
What is the volume of the attic? [*Use* $\pi = 3.14$.] [*Round your answer to the nearest cubic foot.*]

19) If the volume of the pyramid below is 64 ft^3 and the height is 16 ft, what is the area of the base measured in square inches?

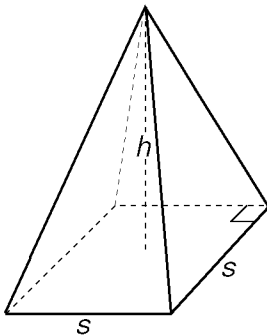20) What is the height of the cone below, to the *nearest* inch, if the volume is 47.1 ft^3?

3.0 in.
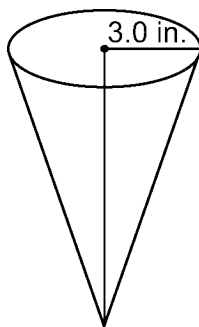
21) A bulk cereal producer wants to fill a jumbo size box with its brand of rice flakes. They decide to fill the box 1 inch from the top instead of filling it completely.

12 in.

Cereal

8 in.   3 in.

How many cubic inches of rice flakes will the producer save by *not* filling the box to the top?

Questions 22 and 23 refer to the following:

Find, to the nearest hundredth, the volume of the given composite solid. [*Show all work.*]
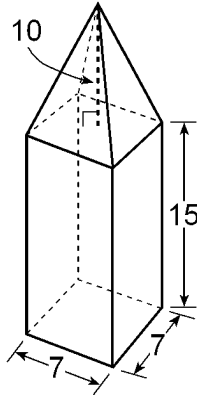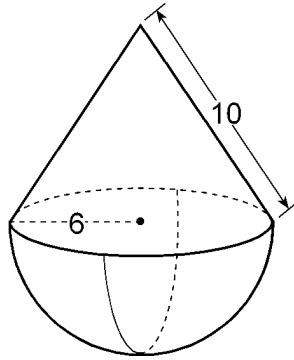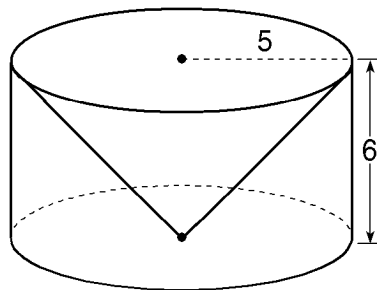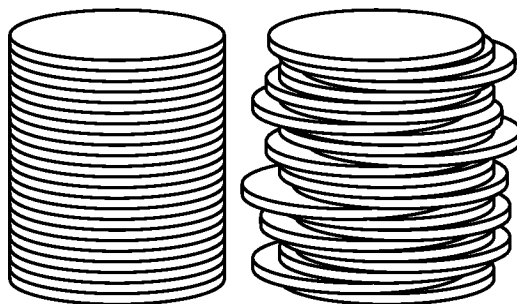
22)

23)

24) In the accompanying diagram, a right circular cone is carved out of a solid foam cylinder and discarded.

What is the volume of the foam remaining in the cylinder?

25) Two stacks of 23 quarters each are shown below. One stack forms a cylinder but the other stack does *not* form a cylinder.

Use Cavelieri's principle to explain why the volumes of these two stacks of quarters are equal.

26) Consider a wood paver that is a rectangular prism having length of 9", height of 3", and thickness of 2". This paver has two identical cylindrical holes cut out, each having a diameter of 2.2". Calculate the mass of the paver, to the nearest hundredth of a pound, if the density of the wood is known to be 0.03 lb/in.^{3}. [*Show all work.*]

27) The density of lead is 11.4 grams/cm^3. If a lead pipe has an outer diameter of 7.4 cm and an inner diameter of 3 cm, what is the mass (in grams) of a piece of lead pipe that is 18 cm long, rounded to the nearest hundredth of a gram? [*Show all work.*]

1) B   2) A   3) A   4) C   5) A

6) B   7) D   8) A   9) B   10) D

11) B   12) D   13) C   14) B   15) A

16) A   17) D

18) $35{,}168 \text{ ft}^3$

19) 12 in.^2

20)   5 in.

21) 24 in.^3

22) 898.33 units^3

WORK SHOWN: $V_{\text{pyramid}} = \frac{1}{3}lwh = \frac{1}{3}(7)(7)(10) = \frac{1}{3}(490) = 163.33333$; $V_{\text{prism}} = lwh = (7)(7)(15) = 735$; $V_{\text{composite}} =$ $163.33333 + 735 = 898.33333 \approx 898.33$

23) 753.98 units^3

WORK SHOWN: $h_{\text{cone}}: 10^2 = 6^2 + h^2, h^2 = 100 - 36 = 64, h = \sqrt{64} = 8$; $V_{\text{cone}} = \frac{1}{3}\pi r^2 h = \frac{1}{3}\pi(6)^2(8) = \frac{1}{3}\pi(288) = 301.5928947$;

$V_{\text{hemisphere}} = \frac{1}{2}(\frac{4}{3}\pi r^3) = \frac{1}{2}(\frac{4}{3}\pi(6)^3) = \frac{1}{2}(\frac{4}{3}\pi(216)) = \frac{1}{2}(904.7786842) = 452.3893421$; $V_{\text{composite}} = 301.5928947 + 452.3893421 =$ $753.9822368 \approx 753.98$

24) 100π cubic units

25)   SAMPLE EXPLANATION: Each quarter in both stacks has the same base area. Therefore, each corresponding cross-section of the stacks will have the same area. Since the two stacks of quarters have the same height of 23 quarters, the two volumes must be the same.

26)   1.16 lb

WORK SHOWN: $V_{\text{paver}} = V_{\text{prism}} - V_{\text{holes}} = \ell wh - 2(\pi r^2 h) = (9)(3)(2) - 2\pi(1.1)^2(2) = 54 - 15.2053 = 38.7947 \text{ in.}^3$; $\text{mass} = (\text{volume})(\text{density}) = (38.7947)(0.03) = 1.163 \approx 1.16$

27)   7,374.85 g

WORK SHOWN: $m = V \times D = (\pi r^2 h \times \pi r^2 h) \times 11.4 = [(\pi)(3.7)^2(18) \times (\pi)(1.5)^2(18)] \times 11.4 = (774.151 - 127.235) \times 11.4 =$ $646.917 \times 11.4 = 7{,}374.851 \approx 7{,}374.85$