BECA / Dr. Huson / Geometry
Unit 4: Volume and polyhedra
17 November 2022

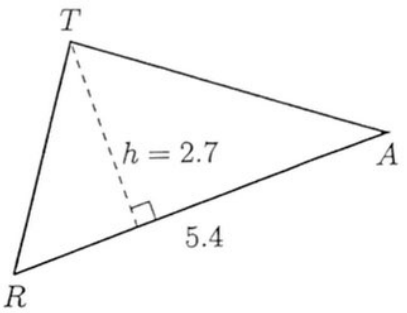
Name: Solutions

4.8 Pretest: Solids, volume, and density

1. Find the area of $\triangle RAT$. The altitude h of the triangle is 2.7 centimeters and the base $RA = 5.4$ cm. Show work by writing an equation before making the calculation.

$A = \frac{1}{2}(2.7)(5.4)$

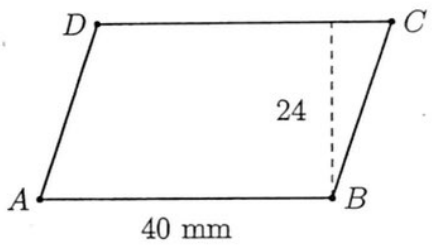
$= 7.29 \text{ cm}^2$



2. Find the area of the parallelogram $ABCD$ shown below, with $AB = 40$ millimeters and height $h = 24$ mm.

$A = 40 \times 24$

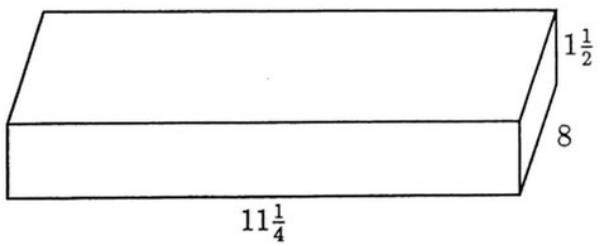
$= 960 \text{ mm}^2$



3. A wooden cutting board is $11\frac{1}{4}$ inches long, 8 inches wide, and $1\frac{1}{2}$ inches thick. Find the volume of wood in cubic inches. **(diagram not to scale)**

$V = (11.25)(8)(1.5)$

$= 135 \text{ in}^3$



Model the situation with an equation. Use formulas from your notebook. You must start with a labeling variable. Do NOT solve!

4. *Worked example:* Find the radius of a circle circumference of 14.7.

$$C = 2\pi r = 14.7$$

5. A prism has a base area of 20 square centimeters. Its volume is 200 cubic centimeters. Find the prism's height, h.

$V = 20h = 200$

6. A water tank in the shape of a cylinder has a volume of 250 cubic feet. Its height is 12 feet. Find the radius of the base of the tank.

$V = \pi r^2(12) = 250$

7. A spherical cork fishing net float has a volume of 4000 cubic centimeters. Find its radius.

$V = \frac{4}{3}\pi r^3 = 4000$

8. The volume of a cone having a **diameter** of 10 inches is 200 cubic inches. Find the cone's height.

$V = \pi\left(\frac{10}{2}\right)^2 h = 200$

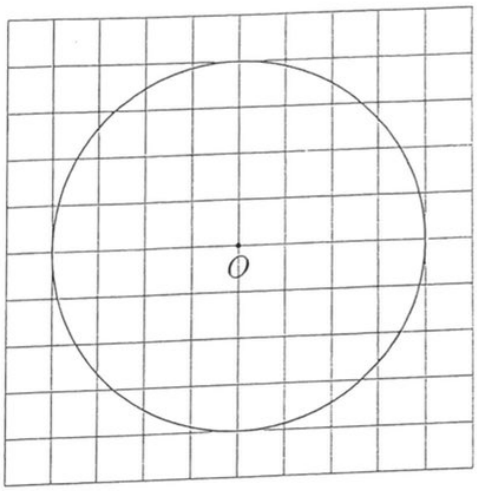
9. The volume of the Great Pyramid of Giza, the tomb of Pharoah Khufu, is approximately 2,500,000 cubic meters. It is 140 meters tall. Find the area of its base.

$V = B(140) = 2,500,000$

10. The smaller pyramid for his wife, Queen Meretites, has a square base with an area of 2500 square meters. Find the length of the side of its base, s.

$A = s^2 = 2500$

11. Given the circle centered at O with radius $r = 4$. Leave answers in terms of π.



(a) Write down the length of the circle's diameter.

8

(b) Find the circumference of a circle.

$C = 8\pi$

(c) Find the area of the circle.

$C = 4^2\pi$

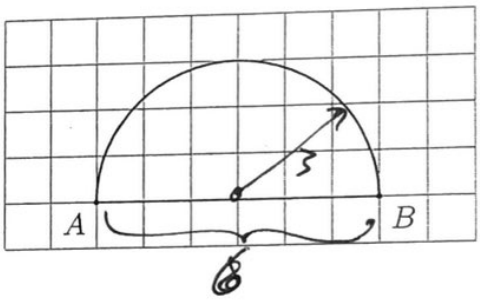
$= 16\pi$

12. Given the semi-circle shown with diameter $AB = 6$. Find its perimeter in terms of π.

$r = 3$

$P = \frac{1}{2}\pi 6 + 6$

$= 3\pi + 6$



13. The rectangular prism shown has a volume of $V = 735$ cubic feet. Its base measures $l = 8.4$ feet by $w = 6.25$ feet.

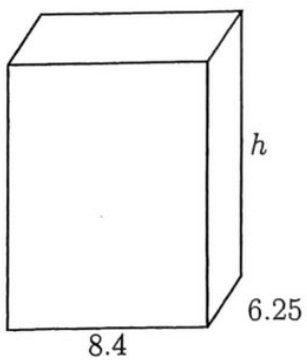
Find its height. Begin by writing the following formula with values substituted:

$V = l \times w \times h = 735$

$V = (8.4)(6.25)h = 735$

$52.5h = 735$

$h = 14$ ft.



Solve these & show units

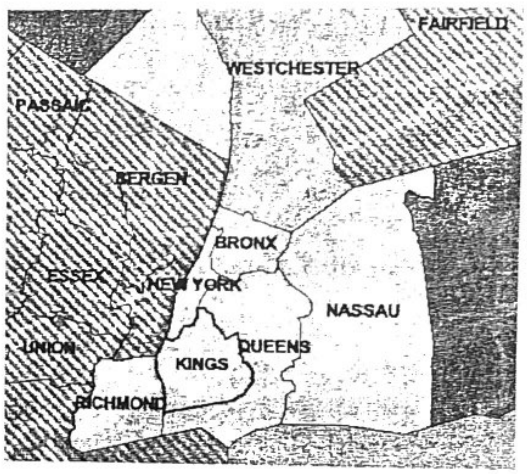
14. A typical bill board measures 14 feet high by 48 feet wide. If billboard paper costs approximately 15 cents per square foot, how much would the paper cost to cover a typical billboard?

$A = 14 \times 48 = 672$ sq ft

$\text{Cost} = 672 \text{ sq ft} \times \frac{\$0.15}{\text{sq ft}} = \$100.80$

15. Find the population density of Brooklyn, (Kings County) in people per square mile.

Population estimate: 2,559,903 (July 2019)
Source: US Census (census.gov)
Land area in square miles: 69.4



$D = \frac{2,559,903}{69.4}$

$= 36,886.21\ldots$

$\approx 36,900$ people/sq mi

16. The American Eagle gold coin is minted by the US Treasury. The one ounce coin has a radius of about $r = 16$ millimeters and thickness $h = 3$ mm. Given a density of $D = 0.014$ grams per cubic millimeter, find the coin's volume and weight.

Show the substitution into both formulas for full credit.

$V = \pi r^2 h$ and $W = VD$

$V = \pi\ 16^2\ (3) = 2412.743\ldots$ mm³

≈ 2410 mm³

$W = 0.014 \times 2412.743\ldots$ g

$= 33.778\ldots$ g

≈ 33.8 g