

GEOMETRY

The Complete Course

Lesson Twenty Nine

Prisms, Pyramids, And Polyhedra

KA8429

Worksheet

Instructors may duplicate the worksheets as needed

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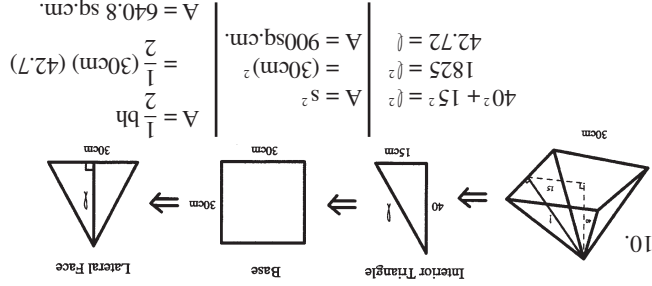
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11. $V = \frac{1}{3} Bh$
 $= \frac{1}{3} (900\text{sq.cm.})(40\text{cm.})$
 $= 12,000\text{sq.cm.}$

T.A. = L.A. + B
 $= \frac{1}{2} (p + B)$
 $= \frac{1}{2} (42.72)(120) + 900$
 T.A. = 3463.2sq.cm.

*NOTE: L.A. = 4 Lateral Faces
 = 4 Congruent Triangles
 $= 4(\frac{1}{2}bh)$ Area of triangle
 $= 4(b)(\frac{1}{2}h)$ Commutative Property
 $= p(\frac{1}{2}h)$ Perimeter = 4b
 $= \frac{1}{2}ph$ Commutative Property
 $= \frac{1}{2}p'$ Height of triangle = l
 *L.A. = $\frac{1}{2}lp$ Commutative Property

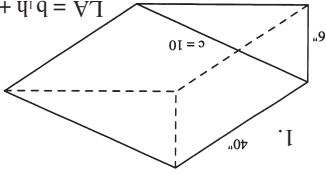
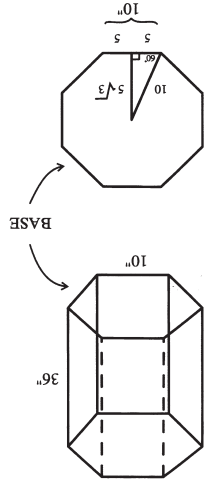


9. $V = Bh$
 $= (259,8076\text{sq.in.})(36\text{in.})$
 $V = 9353,1\text{cu.in.} = 5,4\text{cu.ft.}$

T.A. = L.A. + 2B
 $= 2160 + 2(259,8076)$
 $T.A. = 2679,6\text{sq.in.} = 18,6\text{sq.ft.}$

8. $p = 6(10'') = 60''$
 $L.A. = ph$
 $= (60'')(36'')$
 $L.A. = 2160\text{sq.in.}$
 $A = 259,8076\text{sq.in.}$
 $A = \frac{1}{2}ap$
 $= \frac{1}{2}(5\sqrt{3})(60'')$

7. $\frac{1\text{gal}}{128\text{oz.}} = \frac{4000\text{sq.ft.}}{x\text{gal.}}$
 $250x = 4000$
 $x = 16\text{gal.}$



1. $6^2 + 8^2 = c^2$
 $36 + 64 = c^2$
 $100 = c^2$
 $10'' = c$

2. $V = Bh$
 $V = 1 \cdot w \cdot h$
 $V = (32'')(16'')(4'')$
 $V = 2048\text{cu.ft.}$

3. $V = Bh$
 $V = \frac{1}{2}6'' \cdot 8''(40'')$
 $V = 960\text{ cubic inches}$

4. $V = e^3$
 $= (20'')^3$
 $V = 8000\text{cu.in.}$
 $V = 1 \cdot w \cdot h$
 $8000 = (8'')(5'')(2\frac{1}{2}')$
 $27x = 100$
 $x = 3.7\text{cu.yds.}$

4. $V = e^3$
 $= (20'')^3$
 $V = 8000\text{cu.in.}$
 $V = 1 \cdot w \cdot h$
 $8000 = (8'')(5'')(2\frac{1}{2}')$
 $27x = 100$
 $x = 3.7\text{cu.yds.}$

5. $V = Bh$
 $V = 1 \cdot w \cdot h$
 $1\text{cu.yd.} = 3\text{ft.} \cdot 3\text{ft.} \cdot 3\text{ft.} = 27\text{cu.ft.}$
 $\frac{1\text{cu.yd.}}{x\text{cu.yds.}} = \frac{27\text{cu.ft.}}{100\text{cu.ft.}}$
 $x = 3.7\text{cu.yds.}$

6. Surface area to be painted = 2 rectangles + 2 pentagons
 $= 2(15' \cdot 80')$
 $A_R = 2400\text{sq.ft.}$
 Area of 2 pentagons = 2(Area of rectangle + Area of triangle)
 $= 2(bh + \frac{1}{2}bh)$
 $= 2(40 \cdot 15 + \frac{1}{2}40 \cdot 10)$
 $= 2(600 + 200)$
 $A_P = 1600\text{sq.ft.}$
 Total surface area to be painted = $2400\text{sq.ft.} + 1600\text{sq.ft.}$
 $T = 4000\text{sq.ft.}$

I. VIDEOTAPE FOLLOW-UP QUESTIONS

- I. Introduction.
 - A. Definition of a prism
 - B. Definition of a pyramid
 - C. Definition of a polyhedron
- II. Prisms.
 - A. Definitions
 1. Right prism
 2. Oblique prism
 3. Parts of a prism
 - a) bases
 - b) altitude
 - c) lateral faces
 - d) lateral edges
 - e) base edge
 4. Lateral area
 5. Total area
 6. Volume
 - B. Postulate related to prisms. For any rectangle solid, the volume $V = lwh$, where l , w , and h are the lengths of three edges with a common vertex. (P29-1)
 - C. Theorems related to prisms
 1. The lateral area L.A. of a right prism equals the perimeter of a base p times the height h of the prism. $[L.A. = ph]$ (T29-1)
 - a) Derivation
 - b) Applied example
 2. The total area T.A. of a right prism is the sum of the lateral area L.A. and the area of the two bases, $2B$. $[T.A. = L.A. + 2B]$ (T29-2)
 - a) Derivation
 - b) Applied example
 3. The volume V of a right prism equals the area of a base B times the height h of the prism. $[V = Bh]$ (T29-3)
 - a) Derivation
 - b) Applied example
 4. The volume of a cube with edge e is the cube of e . $[V = e^3]$ (T29-4)
 - a) Derivation
 - b) Applied example

III. Pyramids.

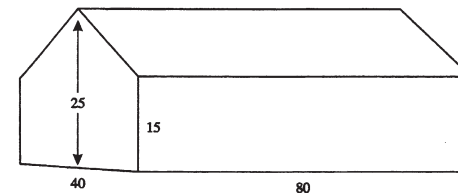
- A. Definitions
 1. Regular pyramid

2. Oblique pyramid
3. Parts' of pyramid
 - a) base
 - b) altitude
 - c) lateral edge
 - d) lateral face
 - e) vertex
4. Lateral area
5. Total area
- B. Theorems, related to pyramids
 1. The lateral area L.A. of a regular pyramid equals one-half the product of the slant height l and the perimeter p of the base.
$$\left[L.A. = \frac{1}{2} lp \right] \quad (T29-5)$$
 - a) Derivation
 - b) Applied example
 2. The total area T.A. of a regular pyramid equals the lateral area L.A. plus the area of the base B . $[T.A. = L.A. + B]$ (T29-6)
 - a) Derivation
 - b) Applied example
 3. The volume V of a pyramid is one-third the product of its height h and the area B of its base. $\left[V = \frac{1}{3} Bh \right]$ (T29-7)
 - a) Derivation
 - b) Applied example

II. SUPPLEMENTARY EXERCISES

1. The base of a prism is a right triangle whose legs are 6 inches and 8 inches and its height is 40 inches. What is the total area of the right triangle prism?
2. What is the volume of the prism in problem number one?
3. A swimming pool is 16 ft. wide, 32 ft. long, and is uniformly 4 ft. deep. How many cubic feet of water does it hold?
4. A cardboard box is a perfect cube with an edge measuring 20 inches. How many cubic feet can it hold?
5. The bed of a pickup truck measures 8 feet long, 5 feet wide, and 2 1/2 feet deep. How many cubic yards of sand can fill it up level?

6-7 A barn is shaped like a pentagonal prism with dimensions as shown in feet.



6. How many square feet (excluding the roof) are there on the surface of the barn to be painted?
7. If a gallon of barn paint covers 250 square feet, how many gallons of paint are needed to paint the barn?
8. A right hexagonal prism is 36 inches tall and has bases that are regular hexagons measuring 10 inches on a side. What is the total surface area?
9. What is the volume of the prism in problem number 8?
10. A regular pyramid has a square base measuring 30 centimeters on a side. If its height is 40 centimeters, what is the total surface area of the pyramid?
11. What is the volume of the pyramid in problem number 10?