By Theorem 12-2, the volume of the right prism is $V = Bh$. Every cross section of each prism has the same area as that prism's base. Since the base areas are equal, the corresponding cross sections of the two prisms have equal areas. Therefore by Cavalieri's Principle, the volume of the oblique prism also is $V = Bh$.

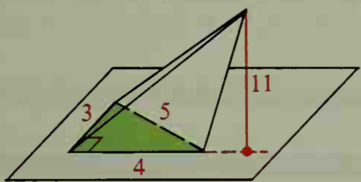
You can use similar reasoning to show that the volume formulas given for a regular pyramid, right cylinder, and right cone hold true for the corresponding oblique solids.

$V = Bh$ for *any* prism or cylinder
$V = \frac{1}{3}Bh$ for *any* pyramid or cone

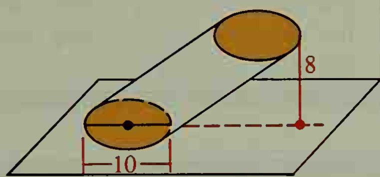
Exercises

Find the volume of the solid shown with the given altitude.

1.

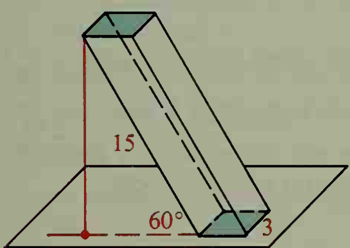


2.

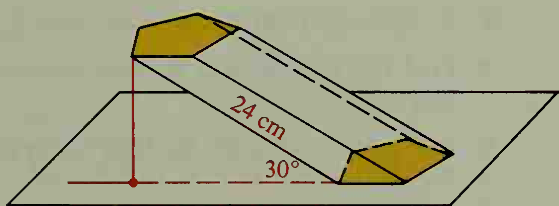


3. Find the volume of an oblique cone with radius 4 and height 3.5.

4. The oblique square prism shown below has base edge 3. A lateral edge that is 15 makes a 60° angle with the plane containing the base. Find the exact volume.



Ex. 4



Ex. 5

5. The volume of the oblique pentagonal prism shown above is 96 cm^3. A lateral edge that is 24 cm makes a 30° angle with the plane containing the base. Find the area of the base.

6. Refer to the justification of the formula for the volume of a sphere given on pages 498–499. How does Cavalieri's Principle justify the statement that the volume of the sphere is equal to the difference between the volumes of the cylinder and the double cone?