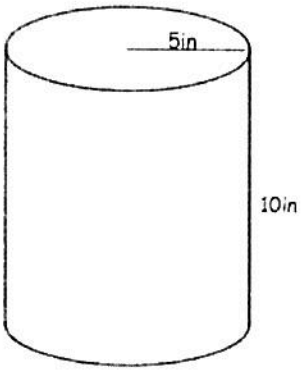
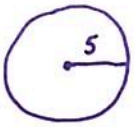
KEY!

Practice Problems



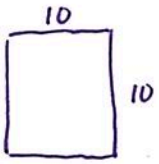
1. If the cylinder is sliced **horizontally**, what are the dimensions of the cross section? Draw a picture of the cross section and label its dimensions.



What is the area of the cross section in terms of pi?

$A = \pi r^2$
$= \pi (5)^2 = 25\pi \text{ in}^2$

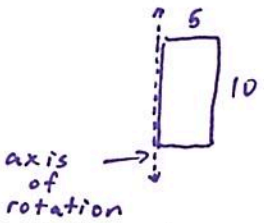
2. If the cylinder is sliced **vertically** through the middle, what are the dimensions of the cross section? Draw a picture of the cross section and label its dimensions.



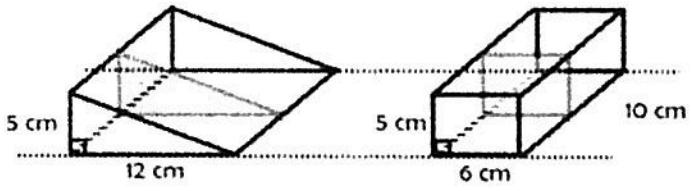
What is the area of the cross section?

$A = l \cdot w$
$= 10 \cdot 10 = 100 \text{ in}^2$

3. What generatrix could be used to generate the cylinder above? Draw and label the dimensions of ALL the possibilities (make sure to include the axis of rotation)



4. Jenny says that the two prisms DO NOT have the same volume because the cross sections are not the same shape. Renee disagrees; she says that it isn't the shape that has to be the same, it is the area that must be equal. Renee thinks they have the same volume. Who is right and why?



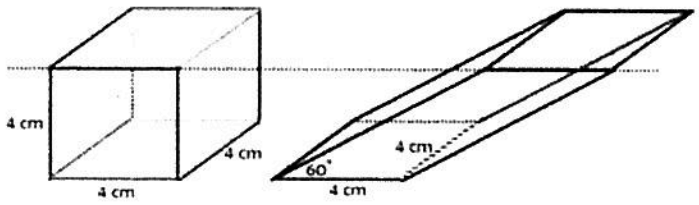
$A = \frac{1}{2}bh$
$A = \frac{1}{2} \cdot 12 \cdot 5$
$A = 30 \text{ cm}^2$

$A = l \cdot w$
$A = 6 \cdot 5$
$A = 30 \text{ cm}^2$

Who is correct? Renee

Explanation: The figures have the same height, cross sections have the same area.

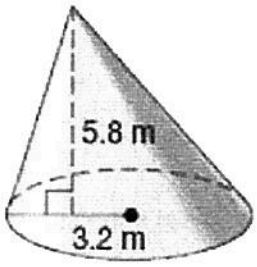
5. If the volume of the cube is 64 cm^3, what is the volume of the oblique prism if it has been tilted at 60°?



Volume: $64\ cm^3$

Explanation: Cavalieri's Principle → same height, cross sections have same area → same volume

6. Find the volume of the cone, to the nearest tenth.

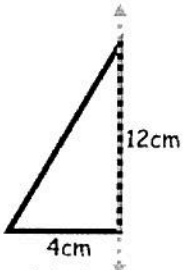


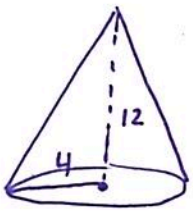
$V = \frac{1}{3}\pi r^2 h$

$V = \frac{1}{3}\pi (3.2)^2 (5.8)$

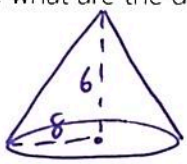
$V = 62.2\ m^3$

7. You are given the generatrix below. Draw the 3D shape created when rotating it about the axis. Label the dimensions.

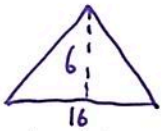




8. If the base is doubled and the height halved, what are the dimensions of the new solid? Draw and label its dimensions:



9. What would the vertical cross section look like? Draw and label its dimensions. What's its area?



$A = \frac{1}{2}bh$

$= \frac{1}{2} \cdot 16 \cdot 6$

$= 48\ cm^2$

10. What could be the length of the slant height of the new generatrix?

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

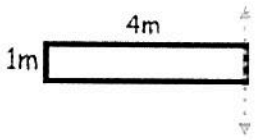
$36 + 64 = x^2$

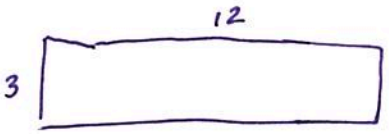
$100 = x^2$

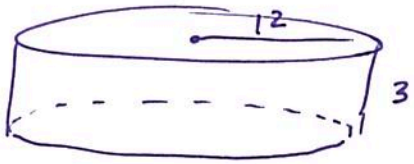
$x = 10$

10 cm

11. If the following generatrix was dilated by a scale factor of 3, what would be the result of rotating it around the given axis? Draw and label its new dimensions.

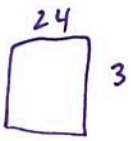




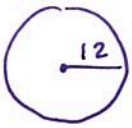


12. What would be the dimensions of the vertical and horizontal cross sections? Draw and label them below.

vertical



horizontal



13. Find the areas of each of the cross sections.

$A = \ell \cdot w$

$= 24 \cdot 3$

$= 72\,m^2$

$A = \pi r^2$

$= \pi (12)^2$

$= 452.4\,m^2$