27th November

Completed Exercises from the lecture on

< Area & Volume >

L. Hard, Pages 2-4;

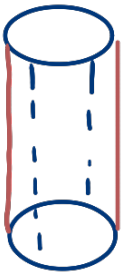
Can be found below.

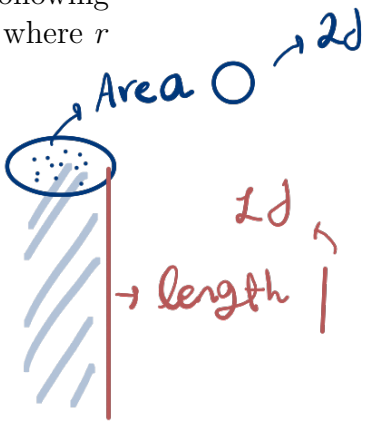
Hard

(1) **b0dc920d** MULTIPLE CHOICE One answer only

A manufacturer determined that right cylindrical containers with a height that is 4 inches longer than the radius offer the optimal number of containers to be displayed on a shelf. Which of the following expresses the volume, V , in cubic inches, of such containers, where r is the radius, in inches?

a. $V = \pi(2r)^3$
b. $V = 4\pi r^3$
c. $V = \pi r^2 + 4\pi r$
d. $V = \pi r^3 + 4\pi r^2$





Area: 2 dim

Volume: 3 dim

$h = r + 4$

length l	× area ○
h	πr^2
$r+4$	× πr^2 = $\pi r^3 + 4\pi r^2$

20% x 20%

l w

(2) **5b2b8866** SHORT ANSWER Case-Insensitive

A rectangular poster has an area of 360 square inches. A copy of the poster is made in which the length and width of the original poster are each increased by 20%. What is the area of the copy, in square inches?

Counter.example

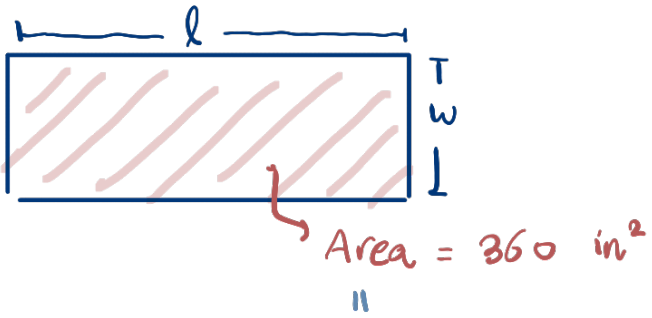
ex:

360

20%

. 360 in → 432 x 20% = 518.4

. 1 in → 1.2



$360 + 20\% \cdot 360$

$(l + 20\%) \times (w + 20\%) = A$

$A_{old} = l_{old} \cdot w_{old} = 360 \text{ in}^2$

$l_{new} = (1 + 20\%)\, l_{old}$

$w_{new} = (1 + 20\%)\, w_{old}$

$A_{new} = l_{new} \cdot w_{new} =$

$= (1 + 20\%)\, l_{old} \cdot (1 + 20\%)\, w_{old} = (l_{old} + 20\% \, l_{old})(w_{old} + 20\% \, w_{old})$

$= l_{old} \cdot w_{old} + l_{old} \cdot 20\% \, w_{old} + 20\% \, l_{old} \cdot w_{old} + 20\% \, l_{old} \cdot 20\% \, w_{old}$

$l_{old} \cdot w_{old} + 2 \cdot 20\% \cdot l_{old} \cdot w_{old} + (20\%)^2 \cdot l_{old} \cdot w_{old}$

$= (\ell + 20\%)\, l_{old} \cdot (\ell + 20\%)\, w_{old}$

$= (\ell + 20\%)(\ell + 20\%)\, w_{old}\, l_{old}$

$= (\ell + 20\%)^2 \underbrace{w_{old}\, l_{old}}_{=360} = 518.4 \text{ in}^2$