

Calculus AB

7-2a

Cross Sections

Find each volume using the area of the known cross-section.

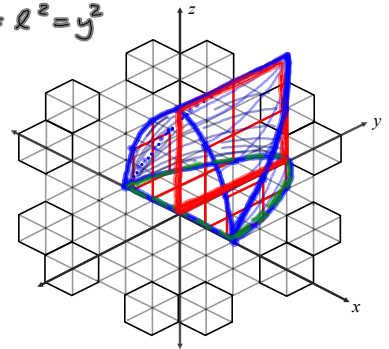
1) $y = 4 - x^2$; square cross-sections, perpendicular to the x -axis.

square $A = s^2 = y^2$

$$\int_{-2}^2 (4-x^2)^2 dx$$

$34.1\bar{3} \text{ units}^3$

34.133 units^3



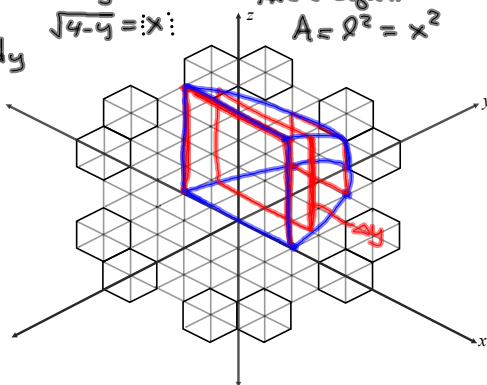
Find each volume using the area of the known cross-section.

2) $y = 4 - x^2$; square cross-sections, perpendicular to the y -axis.

$4 - y = x^2$ Area Square $A = s^2 = x^2$
 $\sqrt{4-y} = |x|$

$$\int_0^4 (\sqrt{4-y})^2 dy$$

$$\int_0^4 (4-y) dy$$



Find each volume using the area of the known cross-section.

3) $y = 4 - x^2$; equilateral triangular cross-sections, perpendicular to the x -axis.

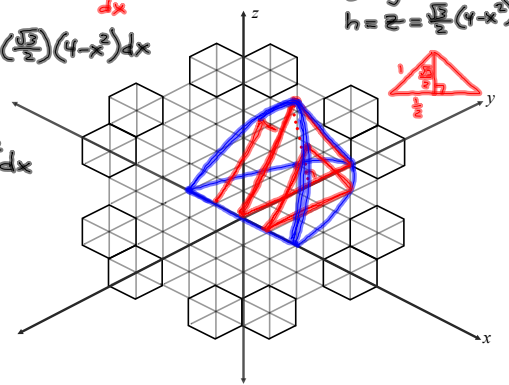
$A = \frac{1}{2}bh$

$b = y = 4 - x^2$

$h = z = \frac{\sqrt{3}}{2}(4 - x^2)$

$$\frac{1}{2} \int_{-2}^2 (4-x^2) \left(\frac{\sqrt{3}}{2}\right) (4-x^2) dx$$

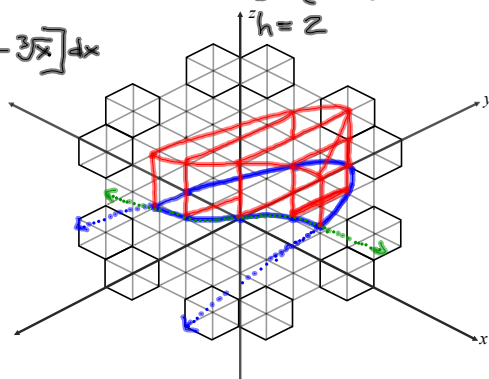
$$\frac{\sqrt{3}}{4} \int_{-2}^2 (4-x^2)^2 dx$$



4) $y = 4 - x^2$; rectangles of height 2
 $y = \sqrt[3]{x}$

$A = b \cdot h$
 $b = (4 - x^2) - \sqrt[3]{x}$
 $h = 2$

$$2 \int [4 - x^2 - \sqrt[3]{x}] dx$$



Assignment:

Pg. 468

71-73 all,

74 a, b, c

Solutions:

72 a) $\frac{128}{3}$

b) $\frac{32}{\sqrt{3}}$

c) $\frac{16\pi}{3}$

d) $\frac{32}{3}$

74 a) $\frac{\pi}{80}$

b) $\frac{\sqrt{3}}{40}$

c) $\frac{\pi}{20}$