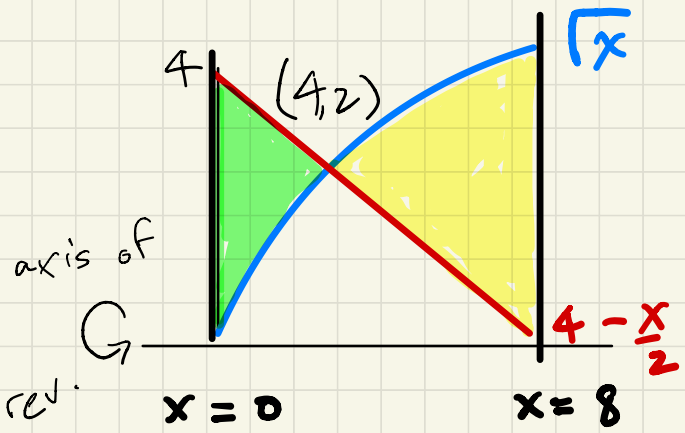
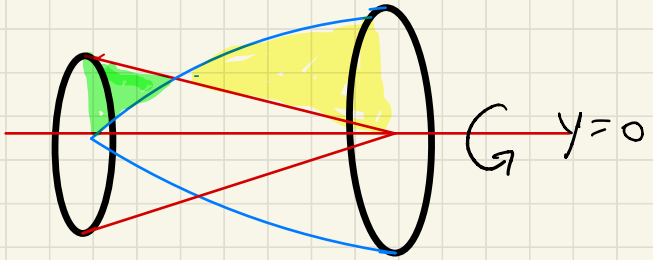
7.2 (p 462) #32





1. Find intersections)

$\sqrt{x} = 4 - \frac{x}{2}$

$x = 16 - 4x + \frac{x^2}{4}$

$x^2 - 20x + 64 = 0$

$(x-4)(x-16)$

GREEN SIDE
$R = 4 - \frac{x}{2}$
$r = \sqrt{x}$
YELLOW SIDE
$R = \sqrt{x}$
$r = 4 - \frac{x}{2}$

2. Area of green & yellow

$$\pi\int_0^4 \left(4-\frac{x}{2}\right)^2 - \left(\sqrt{x}\right)^2\,dx + \pi\int_4^8 \left(\sqrt{x}\right)^2 - \left(4-\frac{x}{2}\right)^2\,dx$$

$$\pi\int_0^4 \left(\frac{x^2}{4} - 5x + 16\right)dx + \pi\int_4^8 \left(\frac{-x^2}{4} + 5x - 16\right)dx$$

$$\pi\left(\frac{x^3}{12} - \frac{5x^2}{2} + 16x\right)\Big|_0^4 + \pi\left(\frac{-x^3}{12} + \frac{5x^2}{2} - 16x\right)\Big|_4^8$$

$$\frac{88\pi}{3} + \frac{56}{3}\pi$$

$$48\pi$$