

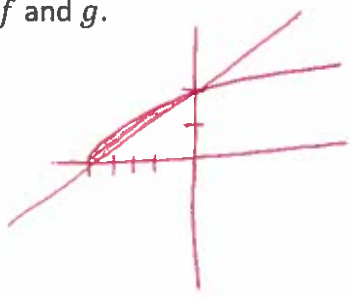
Rotate your name about the name axis: Key

AP Calculus AB: 9.5 Volume with Different Axis

1. Consider the functions $f(x) = \sqrt{x+4}$ and $g(x) = \frac{x}{2} + 2$.

a. Find the area of the enclosed regions created by the functions f and g .

$$\int_{-4}^0 (\sqrt{x+4}) - (\frac{x}{2} + 2) dx = \boxed{\frac{4}{3}}$$



b. Find the volume of the region rotated about the x-axis.

$$\pi \int_{-4}^0 (\sqrt{x+4})^2 - (\frac{x}{2} + 2)^2 dx = \boxed{\frac{8\pi}{3}}$$

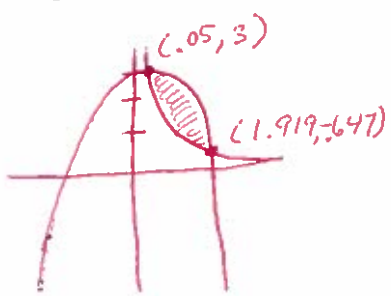
c. Find the volume of the region rotated about the line $y = -2$.

$$\pi \int_{-4}^0 (\sqrt{x+4} - 2)^2 - (\frac{x}{2} + 2 - 2)^2 dx = \boxed{8\pi}$$

2. (Calculator) Consider the functions $f(x) = -x^2 + 3$ and $g(x) = -\ln(x)$.

a. Find the area of the enclosed regions created by the functions f and g .

$$\int_{0.05}^{1.919} (-x^2 + 3) - (-\ln(x)) dx = \boxed{2.783}$$



b. Find the volume of the region rotated about the y-axis.

$$\int_{-0.647}^3 (\sqrt{-y+3})^2 - (e^{-y})^2 dy = \boxed{15.167}$$

c. Find the volume of the region rotated about the line $x = -1$.

$$\int_{-0.647}^3 (\sqrt{-y+3} - 1)^2 - (e^{-y} - 1)^2 dy = \boxed{32.654}$$

d. Find the volume of the region rotated about the line $x = 5$.

$$\int_{-0.647}^3 (5 - e^{-y})^2 - (5 - \sqrt{-y+3})^2 dy = \boxed{72.267}$$