Quiz 5: 6.1 Finding Volumes Using Cross-Sections

1. Find the volume of the solid: The base of the solid is the region bounded by the graphs of \( y = 5x, y = 15 \) and \( x = 0 \). The cross-sections perpendicular to the x-axis are rectangles of height 10. (7 points)

\[
V = \int_{0}^{3} \text{area} \ dx = \int_{0}^{3} 10(15-5x) \ dx = \int_{0}^{3} 150 - 50x \ dx = 150x - \frac{50x^2}{2} \bigg|_{0}^{3} = 450 - \frac{450}{2} = 225
\]

2. Consider the region bounded by \( y = \sqrt{\cos x}, y = 0, x = 0 \) and \( x = \frac{\pi}{2} \). Find the volume of the solid generated by revolving the region about the x-axis. (3 points)

\[
d \text{disk method:} \\
R = \sqrt{\cos x} \\
V = \pi \int_{0}^{\pi/2} \sqrt{\cos x}^2 \ dx = \pi \int_{0}^{\pi/2} \cos x \ dx = \pi \sin x \bigg|_{0}^{\pi/2} = \pi
\]