

MATH 253 HANDBOUT #4

A

1. Find the trapezoid approximation of $\int_0^2 \frac{1}{1+x^2} dx$ for $n = 4$.

Can you calculate the integral exactly?

2. Find the volume of the solid obtained by rotating the region D around y-axis, where D is the region bounded by curves $y = \frac{6}{x}$, $x = 2$, $x = 3$, $y = 2$.

3. Find the arclength of the curve $y = \ln(\sin x)$ between $x = \frac{\pi}{4}$ and $x = \frac{\pi}{2}$.

B

1. Find midpoint approximation of $\int_1^3 \frac{1}{x-4} dx$ for $n = 3$.

Use it to approximate $\ln 3$.

2. Find the volume of the solid obtained by rotating the triangle T with vertices at the points $(1, 1)$, $(1, -2)$ and $(2, 0)$ around y-axis.

3. Find the length of the curve $y^3 = x^2$ between points $O(0, 0)$ and $P(8, 4)$.

C

1. Find midpoint approximation of $\int_1^3 \frac{1}{x} dx$ for $n = 4$. Can you calculate the error?

2. Find the volume of the solid obtained by rotating the region D around x-axis, where D is in the first quadrant below the graph of $y = 2 - x^2$ and above the line $y = x$.

3. Find the length of the part of the circle $x^2 + y^2 = 5$ between points $Q(2, 1)$ and $P(1, 2)$.

D

1. Find the trapezoid approximation of $\int_1^2 \frac{1}{x^2} dx$ for $n = 3$.

Can you calculate the error?

2. Find the volume of the solid obtained by rotating the region D around x-axis, where D is the region bounded by the graph of $y = \frac{2}{x}$ and the lines $x = \frac{1}{2}$, $x = 1$, $y = 4$.

3. Find the length of the curve $y^2 = x^3$ between points $O(0, 0)$ and $P(4, -8)$.