

King Fahd Univ. of Petroleum and Minerals
Faculty of Sciences
Department of Mathematical Sciences

FINAL EXAM
(MATH. 102-051 Section 4)

Name:

ID:

Important instructions:

- Use an HB pencil or a pen (do not use red color)
- Solve the problems completely
- Write down your answers in a clear manner
- Justify all your steps
- Use the back of the page (verso) only for scratching

Prob. 1

Compute $\int_0^{10} \sqrt{10u - u^2} du$

Prob. 2

Find the volume of the solid that results when the region enclosed by $y = \cos x$, $y = \sin x$ and $x = 0$ is revolved about the x -axis

Prob. 3

Find

$$\int_{-3/2}^3 \frac{f(\sqrt{2x+3})}{\sqrt{2x+3}} dx$$

$$\text{if } \int_0^3 f(x) dx = 7$$

Prob. 4

Evaluate the integral $\int_0^1 \frac{x^3}{\sqrt{x^2+1}} dx$ by **two** different methods

Prob. 5

Find the limit $\lim_{u \rightarrow +\infty} \frac{1}{u^{5/2}} \int_0^{2u} \sqrt{1+s^3} ds$

Prob. 6

Use cylindrical shells to find the volume of the region bounded by $x = (y - 1)^2$ and $x = 1$ revolved about the x -axis.

Prob. 7

Let R be the region enclosed by $y = 9 - 4x^2$. Find the volume of the solids obtained by revolving R about each of the following: (a) the line $x = 5$, (b) the line $y = -4$, (c) the y -axis, (d) $y = 6$