

King Fahd University of Petroleum and Minerals  
Quiz 1 Math 102-121 Duration 40 minutes

Name:

ID:

**Q 1** Use five rectangles and left-end points to estimate the area under the graph of

$$f(x) = \begin{cases} \cos x & \text{for } -\frac{\pi}{2} \leq x \leq \frac{\pi}{4} \\ \frac{1}{\sqrt{2}} & \text{for } \frac{\pi}{4} < x \leq \frac{3\pi}{4} \end{cases}$$

from  $x = -\frac{\pi}{2}$  to  $x = \frac{3\pi}{4}$ .

**Q 2** Write the limit below as a definite integral

$$\lim_{n \rightarrow \infty} \sum_{i=1}^n \frac{1}{n} \left( 1 + \sqrt{\frac{2i-1}{n}} \right)^6 .$$

**Q 3** Evaluate the following integral by interpreting it as an area

$$\int_{-2}^1 \sqrt{8 - x^2 + 2x} \, dx.$$

**Q 4** Compute  $f'(\pi/2)$  where  $f$  is a continuous differentiable function such that

$$\int_{x^2}^2 [(\ln t)(\sin t) - f(t)] \, dt = x^3 - 3f(\pi/2).$$

**Q 5** If the velocity of a particle moving along a straight line is given by  $v(t) = \sin(2t) \sin^2(t)$ , then find the distance traveled during the interval time  $[0, \pi]$ .

**Q 6** Evaluate

$$\int \frac{dx}{\sqrt{x} + x\sqrt{x}}$$