

King Fahd University of Petroleum and Minerals  
Quiz 1 Math 102-132 Duration 45 minutes

Name:

ID:

**Q 1** The rate of change of a particle  $S$  moving along a straight line is given by

$$S'(t) = \frac{t e^{\sin^{-1} t^2}}{\sqrt{1-t^4}}.$$

a) Find the net change of the particle  $S$  during the interval time  $[0, \frac{1}{\sqrt{2}}]$ .

b) Find the total distance traveled by the particle  $S$  during the interval time  $[0, \frac{1}{\sqrt{2}}]$ .

**Q 2** Let  $P$  be a partition of  $[-2, 2]$ . Evaluate

$$\lim_{\|P\| \rightarrow 0} \sum_{k=1}^n \Delta x_k \left( \frac{\tan^3(0.5x_k)}{1+x_k^2} + \sqrt{4-x_k^2} \right).$$

**Q 3** Find  $F'(\pi/2)$  where

$$F(x) = \int_1^{x^2} (\cos x \cos \sqrt{t} - \cos(x + \sqrt{t})) dt .$$

**Q 6** Evaluate

$$a) \int \frac{1 + \ln(1-x)^2}{(1-x) \ln \sqrt{1-x}} dx$$

$$b) \int \frac{\cos 2x}{1 + \sin^2 x \cos^2 x} dx$$

**Q 4** Find the area of the region bounded by the curves:

a)  $x = y^2 - 6$ ,  $x = 6 - y^2$ ,  $y = -1$  and  $y = 2$

b)  $x + y = 0$ ,  $xy = 1$ ,  $x = 1$  and  $x = 2$

c)  $y = \sin x$ ,  $y = \cos x$ ,  $0 \leq x \leq \pi/2$ .

**Q 5** Find the average value of the function  $f(x) = \sqrt{x + 3 + \frac{1}{x+1}}$  over the interval  $[0, 1]$ .