King Fahd University of Petroleum and Minerals
Quiz: 2 Math 102 Semester: 121 Duration: 40 minutes

Full Name: ID:
Section:

Question 1 Use cylindrical shells to find the volume of the solid obtained by rotating about the line $y = -2$ the region bounded by $y = -\sqrt{x}$, $y = -\sqrt{2-x}$ and $y = 0$.

Question 2 Evaluate the following integrals:

a) $\int \frac{1}{\sqrt{4x^2-9}}\, dx$

b) $\int \cos(6x)\cos(2x)\,dx$.

c) $\int (\cot^3 x)\csc^2 2x\,(\cos^2 x)\,dx$

d) $\int \sec x \tan^2 x \, dx$

Question 3

a) Find the average value of $f(x) = x(\ln x)^2$ over the interval $[1, \mathrm{e}]$.

b) Show that there exists $c \in [1, \mathrm{e}]$ such that $f(c) = f_{ave}$ where f_{ave} is the average value of the function f over the interval $[1, \mathrm{e}]$.