King Fahd University of Petroleum and Minerals
Quiz: 2 Math 102 Semester: 112 Duration: 40 minutes

Full Name: ID:
Section:

Question 1 Use cylindrical shells to set up the integral for finding the volume of the solid obtained by rotating about the line $x = -1$ the region (in the first quadrant) bounded by $y = x^2$, $x = 2 - y^2$, $x = \frac{3}{2}$ and $y = 0$:
(Do not evaluate the integral(s))

Question 2 Evaluate the following integrals:

a) $\int \frac{1}{\sqrt{4x^2-12x+11}}\, dx$

b) $\int \sin^3(2x+1)\cos^7(2x+1)\,dx$.

c) $\int \frac{\ln(2x^2 \ln\sqrt{x})}{x}\,dx$

Question 3

a) Find the average value of $f(x) = \csc^4 x \sqrt{\cot x}$ on the interval $[\frac{\pi}{4}, \frac{\pi}{2}]$.

b) Show that there exists $c \in [\frac{\pi}{4}, \frac{\pi}{2}]$ such that $f(c) = f_{ave}$ where f_{ave} is the average value of the function f over the interval $[\frac{\pi}{4}, \frac{\pi}{2}]$.