KING FAHD UNIVERSITY OF PETROLEUM & MINERALS

DEPARTMENT OF MATHEMATICS & STATISTICS

MATH102 - Section 02 (Term 162)

Date: March 12, 2017 **Test 2** Duration: 50 minutes

Family Name: _____ **ID #:** _ _ _ _ _ _ _ _ _ _ **Serial #:** _ _

1. Evaluate the following indefinite integrals:

   (a) $\int \frac{1}{\sqrt{x}}\, e^{\sqrt{x}}\, dx$

   (b) $\int e^{x^3+2\ln x}\, dx$ (**Hint**: $a^m a^n = a^{m+n}$)

(5 + 5 = 10 points)

2. Evaluate the following definite integrals:

(a) $\int_0^{\pi/4} (1 + \tan x)^3 \sec^2 x \ dx$

(b) $\int_{-1}^{0} x^5 (x^3 + 1)^{\frac{1}{3}} dx$

(6 + 6 = 12 points)

3. Evaluate the integral $\int_1^4 f(t)\,dt$, where f is an odd function such that, $\int_{-1}^{-2} f(t)\,dt = -3$ and $\int_{-2}^{4} f(-t)\,dt = 7$. **(6 points)**

4. Sketch and find the area of the region enclosed by the curves $y = e^x$, $y = e$ and $x = 0$. **(7 points)**

5. Find the volume of the solid obtained by rotating about the $x-$ axis the region between the curve $y = x^2$ and the $x-$ axis, where $1 \leq x \leq 2$.

(7 points)

6. Find the volume of the solid obtained by rotating about the $y-$ axis the region in the first quadrant bounded by the curves $y = \sqrt{x}$ and $y = x^3$.

(8 points)