King Fahd University of Petroleum and Minerals
Department of Mathematical Sciences
Exam I Math 102 (Sections 11 and 15)
Semester II, 2005–2006 (052)

Name: _____

ID #: _____ Sec. #: _____

---

1. Prove $\dfrac{d}{dx}\, x^r = r\, x^{r-1}$. (2 points)

2. Evaluate $\displaystyle\int \cos^2\left(\frac{x}{2}\right)\, dx$. (2 points)

3. Find the average value of the function $f(x) = x^3$ over the interval $[0, 2]$. (3 points)

Please write your answer in the box below for questions 4 to 9.

4	5	6	7	8	9

4. If $f(x) = 3x$ and $n = 2$, $[1, 2]$, the sum of the area is equal to (3 points)

(a) $\frac{9}{4}$

(b) $\frac{21}{4}$

(c) $\frac{11}{4}$

(d) $\frac{9}{5}$

(e) $\frac{23}{4}$

5. The area of the region enclosed by the curve $y^2 = \frac{1}{x}$, $x = y$ and $y = 3$ is equal to (3 points)

(a) $\frac{3}{2}$

(b) 1

(c) $\frac{5}{2}$

(d) $\frac{10}{3}$

(e) $\frac{2}{3}$

6. $\int_1^3 |2x-4|$ is equal to (3 points)

(a) 2

(b) 0

(c) 8

(d) 12

(e) none

7. The volume of the solid that results when the region enclosed by $x = y^2$ and $x = y$ and is revolved about $y = -1$ is equal to (3 points)

(a) $\frac{7\pi}{15}$

(b) $\frac{3\pi}{2}$

(c) $\frac{\pi}{2}$

(d) 2π

(e) $\frac{5\pi}{2}$

8. $\sum_{k=4}^{20} k^2$ is equal to (3 points)

(a) 2870

(b) 2866

(c) 7140

(d) none

(e) 2856

9. $\int_0^{\frac{2}{\sqrt{3}}} \frac{dx}{4+9x^2}$ is equal to (3 points)

(a) $\frac{\pi}{18}$

(b) $\frac{\pi}{5}$

(c) 5π

(d) $\frac{\pi}{13}$

(e) $\frac{\pi}{3}$