

**University of South Carolina**  
Midterm Examination 1    September 15, 2015  
**Math 142 Section H03**

Closed book examination

Time: 75 minutes

**Name** \_\_\_\_\_

**Instructions:**

No notes, books, or calculators are allowed. If you need more space than is provided use the back of the previous page and clearly indicate you have done so. Simplify your final answers. Full credit may not be awarded for insufficient accompanying work.

1		16
2		9
3		9
4		8
5		10
6		8
Total		60

1. (16 points) Find the following integrals.

(a)  $\int 3x^3 + 2x^2 + 4x - 5 \, dx$

(b)  $\int \frac{1}{r} + e^r + 2^r + \sqrt{r} \, dr$

(b)  $\int \sin(\theta) + 2 \cos(\theta) + 3 \tan(\theta) + 4 \sec(\theta) \, d\theta$

(c)  $\int \sec^2(x) + \sec(x) \tan(x) + \frac{1}{1+x^2} + \frac{1}{\sqrt{1-x^2}} \, dx$

2. (9 points) Find the following integrals.

(a)  $\int x^2(x^3 + 2)^6 dx$

(b)  $\int \frac{t^2 + 2t - 1}{t - 2} dt$

(c)  $\int x \sin(x) dx$

3. (9 points) Find the following integrals.

(a)  $\int_1^e x \ln(x) dx$

(b)  $\int \sin^2(2\theta) d\theta$

(c)  $\int \cos^3(a) da$

4. (8 points) Find  $\int \frac{1}{(\sqrt{x^2 - 4})^3} dx$  for  $x > 2$ .

5. (10 points) Find the following integrals.

(a)  $\int \frac{2x + 7}{x^2 + x - 2} dx$

(b)  $\int \frac{x + 1}{x^2 - 4x + 13} dx$

6. (8 points) Determine whether the following integrals converge or diverge. If they converge, find their values.

(a)  $\int_0^{\infty} \frac{1}{4+x^2} dx$

(b)  $\int_{-2}^1 \frac{1}{x^2} dx$