Summer 2002

American University of Beirut
Dr. H. Yamani
Name:

Math 102
Final Exam

****GOOD LUCK****

AMERICAN UNIVERSITY LIBRARY OF BEIRUT

1. Evaluate

$$\lim_{x \to 0} (x + e^{x})^{2/x}$$

2. Find dy/dx

$$y = (\ln x)^{1/(\ln x)}$$

3. Determine each of the following:

$$\int \frac{dx}{4 + x^2}$$

$$\int \frac{dx}{9 - 4x^2}$$

$$\int_1^{\pi/2} \sin(\ln x)\, dx$$

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

$$\int \frac{x^3\, dx}{\sqrt{9 - x^2}} \qquad -3<x<3$$

$$\int_0^{\infty} \frac{dx}{e^{x} + e^{-x}}$$

$$\int \frac{x\, dx}{\sqrt{(8 - 2x^2 - x^4)}}$$

4. Find the area shared by the circles $r = 4\cos\theta$ and $r = 4\sin\theta$

5. Graph the polar curve $r = 1 + 2\cos\theta$

6. Find the equation of the plane through the point (-1,6,0) perpendicular to the line $x = -1 + t$, $y = 6 - 2t$, $z = 3t$

7. Find the angle between $\mathbf{u} = \mathbf{i} - 2\mathbf{j} - 2\mathbf{k}$ **and** $\mathbf{v} = 6\mathbf{i} + 3\mathbf{j} + 2\mathbf{k}$

8. Determine whether the following converges or diverges:

$$\int_1^{\infty} \frac{\sqrt{(x^3 + 1)}\,dx}{x^3}$$

AMERICAN UNIVERSITY LIBRARY OF BEIRUT

AMERICAN UNIVERSITY LIBRARY OF BEIRUT