

Exam 3

Name _____.

1. (24 points) Find the Taylor series (first four nonzero terms for parts a and b) for each of the following:

a. $f(x) = \sqrt[3]{1 - 3x}$ about $x=0$.

b. $f(x) = e^x \sin(x^2)$ about $x=0$.

c. $f(x) = 3 + 4x + 6x^2$ about $x=2$.

2. (13 points) Draw the contour diagram for $f(x, y) = x^2 - y^2 + 1$.

3. (13 points) Find the present value of a 40 million dollar contract that you sign today if there are 20 equal payments six months apart where your first payment is today. Assume a bank has an annual interest rate of 8 percent and they compound interest four times a year.

4. (24 points)

a Find the linear function $f(x,y)$ that has the contour diagram given below.

b Find the linear function whose graph passes through the three points $(1,2,3)$, $(1,4,7)$, $(3,2,4)$.

c Given that the table below is for a linear function $f(x,y)$ fill in the blanks.

5. (12 points) Find the Fourier polynomial of degree three for the function

$$f(x) = \begin{cases} 0, & -\pi < x < \frac{-\pi}{2} \\ 1, & \frac{-\pi}{2} < x < \frac{\pi}{2} \\ 0, & \frac{\pi}{2} < x < \pi \end{cases}$$
$$f(x + 2\pi) = f(x)$$

6. (14 points) Graph the following surfaces:

a $z = y^2 + 1$.

b $z = \sqrt{x^2 + y^2}$