Math 221 Calculus 2
Professor Bacim Alali

Midterm 3
Fall 2018

Your name:_____

Rec. Instructor:_____ Rec. Time:_____

Show all your work in the space provided under each question. Please write neatly and present your answers in an organized way. You may use one sheet of notes, but no books, calculators, cell phones, or other electronic devices. This exam is worth 60 points. The chart below indicates how many points each problem is worth.

Problem	1	2	3
Points	/12	/12	/12
Problem	4	5	Total
Points	/12	/12	/60

1. Determine whether the series converges or diverges. List each test of convergence used.

$$\sum_{n=0}^{\infty} \frac{(-1)^n \cos(n-1)}{n^3+1}$$

2. Find the third Taylor polynomial $p_3(x)$ centered at $c = 1$ for the function $f(x) = 9\,x^{\frac{1}{3}}$.

3. A curve is given by the parametrization $x(t) = \sqrt{t+1}, \quad y(t) = \frac{1}{3}t^3 - 6$. Find an equation for the tangent line to this curve at $t = 3$.

4. Find the interval of convergence for the power series

$$\sum_{n=0}^{\infty} \frac{(-1)^n (x+1)^n}{n\, 2^n}$$

5. Use the power series for the sine, $\sin(x) = \sum_{n=0}^{\infty} \frac{(-1)^n \, x^{2n+1}}{(2n+1)!}$, to find the Taylor series for the function $f(x) = x^2 \sin(x) - x^3$ at $c = 0$.