

Practice Test 3, Math 112, Section 2 (Vinroot)

Name: _____

In order to receive full credit, you must show all of your work and clearly present all steps leading up to your answers. Please do not open the test until time begins.

NO CALCULATORS, NOTES, OR BOOKS ALLOWED.

Problem	1	2	3	4	5	Total
Score						

1. Determine whether each of the following *sequences* converges or diverges, and explain your answer. If the sequences converges, find the limit.

(a): $a_n = \frac{3n^3 + 2}{5n^3 - n^2 + 1}$.

(b): $b_n = \frac{e^n}{n^2}$.

(c): $c_n = ((-1)^n/n) - 2$.

(d): $d_n = \sin(\pi n/4)$.

2. Determine if the following series converge or diverge, and explain why, including which tests you are applying, and why you can apply them.

(a):

$$\sum_{n=1}^{\infty} \frac{3n^2 + 2}{n^2 - 2n + 1}.$$

(b):

$$\sum_{n=1}^{\infty} \frac{\sin^2(n)}{n^2 + 17}.$$

3. Determine if the following series converge or diverge, and explain why, including which tests you are applying, and why you can apply them.

(a):

$$\sum_{n=1}^{\infty} (-1)^{n+1} \frac{2}{3n+1}.$$

(b):

$$\sum_{n=1}^{\infty} \frac{n^2}{n^3 - 2n - 7}.$$

4 (a): Determine whether the following series converges or diverges, and explain the test you are applying, and why it works:

$$\sum_{n=2}^{\infty} \frac{1}{n(\ln(n))^3}.$$

(b): Calculate the exact value of the following series:

$$\sum_{n=1}^{\infty} \frac{2 + (-3)^{n-1}}{5^{n-1}}.$$

5. Find the radius of convergence and interval of convergence of the following power series, and be sure to explain all steps:

$$\sum_{n=0}^{\infty} \frac{(-1)^n n^2}{(n+1)!} (x-3)^n.$$