Math 116 Exam 2

February 20, 2020

Directions:

1. WRITE YOUR NAME ON THIS TEST!

2. Except where indicated, merely finding the answer to a problem is not enough to receive full credit; you must show how you arrived at that answer.

3. Unless otherwise indicated, DO NOT convert irrational numbers such as $\sqrt{3}$ or π into decimal approximations; just leave them as they are.

4. If you have a question, raise your hand or come up and ask me.

1) a) Is the following use of partial fractions correct? If not, how do you fix the set-up?

$$\frac{1}{(2-x)(2+x)(4+x^2)} = \frac{A}{2-x} + \frac{B}{2+x} + \frac{C}{4+x^2}.$$

b) Use partial fractions to simplify $\dfrac{1}{x(3-x)}$.

2) Determine whether the following sequences are geometric. If either one is geometric, find the ratio r.

a) $a_n = \dfrac{5^n}{n^2 + 7}$

b) $b_n = \dfrac{14^{n-8}}{3^{3n-2}}$

3) a) If $(a_n)_{n=1}^\infty$ is a sequence of real numbers, define what it means for $\sum\limits_{n=1}^{\infty} a_n$ to equal a real number L.

b) Using the definition of convergence for a series, find the sum of

$$\sum_{n=1}^{\infty} \left(\frac{2}{(n+3)^2} - \frac{2}{(n+4)^2} \right)$$

or show the series diverges.

4) Determine whether the following sequence converges or diverges. If it converges, find the limit.

$$a_n = \left(1 + \frac{15}{n^3}\right)^{n^3}$$