Math 231.   Quiz 3.   Individual part.   Name:_____

You have 20 minutes. Please show all your work.
No notes, calculators or electronic devices of any kind are permitted.

1. Consider the series $\sum_{n=1}^{\infty}(-1)^{n+1}\dfrac{2}{1+n}$.

   a) Use the Alternating Series Test to confirm that this series converges.

   b) If the value of the series is S, find the smallest number n such that the nth partial sum S_n satisfies $|S - S_n| < 1/5$.

2. Find the interval of convergence of the power series $\sum_{n=0}^{\infty}\dfrac{(-3)^n}{n^2+1}(x-2)^n$.

3. Consider the function $f(x) = \dfrac{x^2}{2 + 4x^2}$.

a) Express the function $f(x)$ as a power series centered at $a = 0$. Write your answer using $\sum$ notation AND write the first three terms.

$\sum$	$=$	$+\ldots$

b) Find the radius of convergence of this power series.

c) Find the power series centered at $a = 0$ for $f'(x)$. If you are not confident that your answer in part a) is correct, find the power series for $g'(x)$ instead, where
$$g(x) = \sum_{n=0}^{\infty} 3^n x^{2n+3}.$$