Math 120 Spring 2014 Quiz **SEVEN**

SHOW YOUR WORK

Determine whether the following infinite series converge or diverge. Support your answer by referring to what test you used to make your determination. You get one point for writing the correct choice of convergence and divergence in the box and the rest of the points for the reasoning behind your answer.

1. (*3 points*) $\sum_{k=1}^{\infty}\left(-\frac{1}{2}\right)^k$ $= -\frac{1}{2}+\frac{1}{4}-\frac{1}{8}+\frac{1}{16}-\cdots$ This is a geometric series with $a=-\frac{1}{2}, r=-\frac{1}{2}$

CONVERGE

$r=-\frac{1}{2}$

$|r| = \left|-\frac{1}{2}\right| = \frac{1}{2} < 1 \Rightarrow$ The Geometric series converges

2. (*4 points*) $\sum_{k=1}^{\infty}\frac{1}{k^2+3}$

CONVERGE

$\frac{1}{K^2+3} < \frac{1}{K^2}$ since $K^2 < K^2+3$ for all $K>1$

Since $\sum_{K=1}^{\infty}\frac{1}{K^2}$ converges by p-series test $p=2>1$ then

$\sum_{K=1}^{\infty}\frac{1}{K^2+3}$ converges by the comparison test

3. (*3 points*) $\sum_{k=1}^{\infty}k^{3/2}$

DIVERGE

$\lim_{K\to\infty} K^{3/2} = \infty \neq 0$

$\sum_{K=1}^{\infty} K^{3/2}$ DIVERGES by the n^{th} term test