Mathematics 174

Quiz # 14 Name: Key

You must show your work to get full credit.

1. If $\frac{1}{3}, -\frac{2}{4}, \frac{3}{5}, -\frac{4}{5}, \frac{5}{7}, \ldots$ is a sequence of the form $a_1, a_2, a_3, \ldots$ give a formula for a_k.

$a_k =$ $(-1)^{k+1}\frac{k}{k+2}$

2. Evaluate the sum $\sum_{k=1}^{15}\left(\frac{2}{k} - \frac{2}{k+1}\right)$.

$= \left(\frac{2}{1} - \frac{2}{2}\right) + \left(\frac{2}{2} - \frac{2}{3}\right) + \left(\frac{2}{3} - \frac{2}{4}\right)$ The sum is $\frac{15}{8}$

$+ \cdots + \left(\frac{2}{14} - \frac{2}{15}\right) + \left(\frac{2}{15} - \frac{2}{16}\right)$

$= \frac{2}{1} - \frac{2}{16} = 2 - \frac{1}{8} = \frac{16-1}{8} = \frac{15}{8}$

3. Evaluate the following.

$\frac{100!}{101!} =$ $\frac{1}{101}$

$\binom{5}{3} =$ $\binom{5}{2} = \frac{5\cdot 4}{1\cdot 2} = 10$

$\binom{n}{n-1} =$ $\binom{n}{1} = n$