Math 172 Quiz 10.2
Sections: 10.1-10.2
23 October 2018

Name: _____

Point values in $\boxed{\text{boxes}}$.

1. $\boxed{7}$ For each of the following series determine if it is geometric or not. If it is geometric find the sum or state the series diverges.

(a) $\displaystyle\sum_{n=0}^{\infty} \frac{1}{2^n} = \frac{1}{1-\frac{1}{2}} = 2$

- The series **is geometric** / **is NOT geometric.**
- If geometric, find the sum or state the series diverges.

(b) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n^2}$

- The series **is geometric** / **is NOT geometric.**
- If geometric, find the sum or state the series diverges.

(c) $\displaystyle\sum_{n=0}^{\infty} \frac{2^{2n}}{3^n} = \sum_{n=0}^{\infty} \left(\frac{4}{3}\right)^n$

- The series **is geometric** / **is NOT geometric.**
- If geometric, find the sum or state the series diverges. $\leftarrow$ $r = \frac{4}{3} > 1$

(d) $\displaystyle 3 - \frac{6}{5} + \frac{12}{25} - \frac{24}{125} + \frac{48}{625} - \cdots = \frac{3}{1-(-2/5)} = \frac{3}{7/5} = \frac{15}{7}$

- The series **is geometric** / **is NOT geometric.**
- If geometric, find the sum or state the series diverges.

2. $\boxed{3}$ Consider the series

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

(a) Write out the partial sums S_3, S_4 and S_N.

$S_3 = \left(1 - \cancel{\tfrac{1}{2}}\right) + \left(\cancel{\tfrac{1}{2}} - \tfrac{1}{3}\right) = 1 - \tfrac{1}{3}$ $\qquad S_N = 1 - \frac{1}{N}$

$S_4 = \left(1 - \cancel{\tfrac{1}{3}}\right) + \left(\cancel{\tfrac{1}{3}} - \tfrac{1}{4}\right) = 1 - \tfrac{1}{4}$

(b) Find the sum of the series or show that it diverges.

$S_N = 1 - \frac{1}{N} \xrightarrow[\text{as } N \to \infty]{} 1$