Math 182 Short Quiz Name: ____________

Due: 6 Mar 2018 Section: 10.1/10.2 Point Values in $\boxed{\text{boxes}}$.

1. $\boxed{6}$ Please indicate **T**rue or **F** false.

   (a) **T** / **F** : The telescoping series

$$\left(1-\cancel{\frac{1}{2}}\right)+\left(\cancel{\frac{1}{2}}-\cancel{\frac{1}{3}}\right)+\left(\cancel{\frac{1}{3}}-\cancel{\frac{1}{4}}\right)+\left(\cancel{\frac{1}{4}}-\cancel{\frac{1}{5}}\right)+\left(\cancel{\frac{1}{5}}-\frac{1}{6}\right)+\cdots \qquad S_N = 1 - \frac{1}{N+1} \xrightarrow[N\to\infty]{} 1$$

   converges to 1.

   (b) **T** / **F** : The telescoping series

$$(\ln 1-\cancel{\ln 2})+(\cancel{\ln 2}-\cancel{\ln 3})+(\cancel{\ln 3}-\cancel{\ln 4})+(\cancel{\ln 4}-\cancel{\ln 5})+(\cancel{\ln 5}-\ln 6)+\cdots$$

   converges to $\ln 1$. $S_N = \ln 1 - \ln(N+1) \xrightarrow[N\to\infty]{} \infty$

   (c) **T** / **F** : A convergent sequence is bounded.

   (d) **T** / **F**: A decreasing sequence converges. $\{-1,-2,-3,-4,\cdots\}$

   (e) **T** / **F**: A convergent sequence is monotone. $\{\frac{1}{2}, -\frac{1}{3}, \frac{1}{4}, -\frac{1}{5}, \cdots\}$ or $(-\frac{1}{2})^n$

   (f) **T** / **F** : An increasing bounded sequence converges.

2. $\boxed{1}$ A formula for the N^{th} partial sum is given. Determine if the associated series converges; if so, find the sum.

$$S_N = \left(1+\frac{1}{N}\right)^N \qquad S = e$$

3. $\boxed{3}$ Consider the series $\displaystyle\sum_{n=3}^{\infty}\left(\frac{2}{n}-\frac{2}{n+2}\right)$.

   (a) Write out the partial sums S_5 and S_N. Do not mindlessly perform unneeded arithmetic.

$$S_5 = \left(\frac{2}{3}-\cancel{\frac{2}{5}}\right)+\left(\frac{2}{4}-\frac{2}{6}\right)+\left(\cancel{\frac{2}{5}}-\frac{2}{7}\right)$$

$$\vdots$$

$$S_N = \frac{2}{3}+\frac{2}{4}-\frac{2}{N+1}-\frac{2}{N+2}$$

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

$$S_N \xrightarrow[N\to\infty]{} \frac{2}{3}+\frac{2}{4} = \frac{7}{6}$$