Worksheet week 12 - MAC2312 Spring 2017 **NAME:** _____

1. True or False. Answer and briefly justify in each case.

(a) If $\lim_{k\to+\infty} a_k = 5$ then the series $\sum_{k=1}^{\infty} a_k$ is convergent to 5.

(b) If $\sum_{k=1}^{\infty} a_k = 5$ then $\lim_{k\to+\infty} a_k = 0$.

(c) If $a_k \leq k^{1/5}$ for all $k \geq 1$ then $\sum_{k=1}^{\infty} a_k$ is convergent.

(d) The series $5 - 5 + 5 - 5 + 5 - 5 + \ldots$ is convergent to zero.

(e) If $\sum_{k=1}^{\infty} a_k = 5$ and $\sum_{k=1}^{\infty} b_k = 5$ then $\sum_{k=1}^{\infty}(2a_k - b_k) = 5$.

2. Determine if each of the following series is convergent or divergent. Justify your answer

(a) $\sum_{k=1}^{\infty} \frac{1}{1+\sqrt{k}}$

(b) $\sum_{k=2}^{\infty} \frac{1}{k(\ln k)^2}$

(c) $\sum_{k=1}^{\infty} \frac{1}{\sqrt[k]{\pi}}$

(d) $\sum_{k=2}^{\infty} \frac{k \ln k}{k^4+1}$

(e) $\sum_{k=1}^{\infty} \left(\frac{2k+1}{3k-1}\right)^k$

(f) $\sum_{k=0}^{\infty} \frac{(k!)^2}{(2k)!}$