1. (4 pts.) Determine whether the sequence converges or diverges. If it converges, give the value if possible.

   (a) $\left\{ \dfrac{4\tan^{-1}(n)}{\pi} \right\}_{n=1}^{\infty}$

   (b) $\left\{ \dfrac{(-1)^n(n+1)}{n+2} \right\}_{n=1}^{\infty}$

2. (6 pts.) Determine whether the series converges or diverges. If it converges, give the value if possible.

   (a) $\displaystyle\sum_{k=0}^{\infty} \dfrac{3}{4^k} =$

   (b) $\displaystyle\sum_{k=1}^{\infty} \left(\dfrac{5}{k} - \dfrac{5}{k+1} \right) =$

1. (4 pts.) Determine whether the sequence converges or diverges. If it converges, give the value if possible.

   (a) $\left\{(-1)^n \tan^{-1}(n)\right\}_{n=1}^{\infty}$

   (b) $\dfrac{\ln(2)}{2}, \ \dfrac{\ln(3)}{3}, \ \dfrac{\ln(4)}{4}, \ \dfrac{\ln(5)}{5}, \ \dots$

2. (6 pts.) Determine whether the series converges or diverges. If it converges, give the value if possible.

   (a) $\displaystyle\sum_{k=0}^{\infty} \dfrac{5}{2^k} =$

   (b) $\displaystyle\sum_{k=1}^{\infty} \left(\sqrt{\dfrac{2}{k}} - \sqrt{\dfrac{2}{k+1}} \right) =$

1. (4 pts.) Determine whether the sequence converges or diverges. If it converges, give the value if possible.

(a) $\left\{ \cos\left(\dfrac{\pi n}{3n+1} \right) \right\}_{n=1}^{\infty}$

(b) $\dfrac{\ln(2)+1}{\ln(2)+2}, \dfrac{\ln(3)+1}{\ln(3)+2}, \dfrac{\ln(4)+1}{\ln(4)+2}, \dfrac{\ln(5)+1}{\ln(5)+2}, \ldots$

2. (6 pts.) Determine whether the series converges or diverges. If it converges, give the value if possible.

(a) $\displaystyle\sum_{k=0}^{\infty} \dfrac{7}{5^k} =$

(b) $\displaystyle\sum_{k=1}^{\infty} \left(e^{1-k} - e^{-k} \right) =$

1. (4 pts.) Determine whether the sequence converges or diverges. If it converges, give the value if possible.

   (a) $\left\{ \dfrac{\sin(n)}{n} \right\}_{n=1}^{\infty}$

   (b) $\left\{ \dfrac{n}{e^n + n} \right\}_{n=1}^{\infty}$

2. (6 pts.) Determine whether the series converges or diverges. If it converges, give the value if possible.

   (a) $\displaystyle\sum_{k=0}^{\infty} \dfrac{4}{3^k} =$

   (b) $\displaystyle\sum_{k=1}^{\infty} \Big(\ln(k) - \ln(k+1) \Big) =$