MATH 230
11.2

Directions: Show all work on a separate sheet of paper for full credit.

1. Calculate the first eight terms of the sequence of partial sums to 4 decimals.

   (a) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{\sqrt[3]{n}}$ $\{1, 1.7937, 2.4871, 3.1170, 3.7018, 4.2421, 4.7749, 5.2749\}$

   (b) $\displaystyle\sum_{n=1}^{\infty} \sin n$ $\{0.8415, 1.7508, 1.8919, 1.1351, 0.1762, -0.1033, 0.5537, 1.5431\}$

2. Let $a_n = \frac{2n}{3n+1}$.
   a) Determine whether $\{a_n\}$ is convergent. (Converges to 2/3)
   b) Determine whether $\sum_{n=1}^{\infty} a_n$ is convergent. Diverges by Divergence Test

3. Determine whether the geometric series is convergent or divergent. If it is convergent, find its sum.

   (a) $3 - 4 + \frac{16}{3} - \frac{64}{9} + ...$ Diverges $r = 4/3$

   (b) $2 + 0.5 + 0.125 + 0.03125 + ...$ Converges to 8/3

   (c) $\displaystyle\sum_{n=1}^{\infty} 12(0.73)^{n-1}$ Converges to 400/9

   (d) $\displaystyle\sum_{n=1} \frac{(-3)^{n-1}}{4^n}$ Converges to $\frac{1}{7}$

   (e) $\displaystyle\sum_{n=1}^{\infty} \frac{e^{2n}}{6^{n-1}}$ Diverges ($r \approx 1.23 > 1$)

4. Determine if the series are convergent or divergent. Explain.

   (a) $\displaystyle\sum_{n=1}^{\infty} 3^{n+1}4^{-n}$ Converges to 9

   (b) $\displaystyle\sum_{n=1}^{\infty} \frac{n^2}{n^2 - 2n + 5}$ Diverges by Divergence Test

   (c) $\displaystyle\sum_{n=1}^{\infty} (-0.2)^n + (0.6)^{n-1}$ Converges to 7/3

   (d) $\displaystyle\sum_{n=1}^{\infty} \frac{2+n}{1-2n}$ Diverges by Divergence Test

   (e) $\displaystyle\sum_{n=1}^{\infty} \frac{1}{1 + (2/3)^n}$ Diverges by Divergence Test

   (f) $\displaystyle\sum_{n=1}^{\infty} \arctan(n)$ Diverges by Divergence Test

5. Find the values of x for which the series $\sum_{n=0}^{\infty} \frac{(x-2)^n}{3^n}$, $\sum_{n=1} (-5)^n x^n$ converges.

answer: $\sum_{n=0}^{\infty} \frac{(x-2)^n}{3^n}$ converges to $\frac{3}{5-x}$ when $-1 < x < 5$.

answer: $\sum_{n=1} (-5)^n x^n$ converges to $\frac{-5x}{1+5x}$ when $-\frac{1}{5} < x < \frac{1}{5}$