**MATE 3032 assignment 8: sections 11.1, 11.2**

63. Determine whether the sequence is increasing, decreasing or not monotonic. Is the sequence bounded?

    (a) $a_n = \dfrac{1}{2n-1},\ n \geq 1$

    (b) $b_n = 2 + 3ne^{-n}$.

64. Exercise 81 p.705. Use mathematical induction.

65. Exercise 16 p.716.

66. Determine whether the geometric series converges or diverges. If it converges, find its sum

    (a) $\displaystyle\sum_{n=1}^{\infty} \frac{e^{2n}}{8^{n+1}}$

    (b) $\displaystyle\sum_{n=1}^{\infty} \frac{4 \cdot 2^{2n-1}}{3^n}$.

67. Determine whether the series converges or diverges. If it converges, find its sum

    (a) $\dfrac{1}{4} + \dfrac{1}{8} + \dfrac{1}{12} + \dfrac{1}{16} + \dots$

    (b) $\displaystyle\sum_{j \geq 0} \frac{j^2}{j^2 - 2j + 4}$

    (c) $\displaystyle\sum_{k \geq 1} \left( \frac{2}{4^k} + \frac{3}{k} \right)$.

68. Express the partial sum $s_n$ as a telescoping sum to determine whether the series converges or diverges. If it converges, find the sum:

$$\sum_{n=2}^{\infty} \frac{2}{n^2 - 1}.$$

69. Express $0.\overline{7} = 0.7777\dots$ as a rational number (ratio of integers).

70. For which values of x does $\sum_{n \geq 1} (x-2)^n$ converge? For those values of x, find the sum of the series in terms of x.

71. The $n$th partial sum of a series $\sum_{n=2}^{\infty} a_n$ is $s_n = \dfrac{n+1}{n-1}$. Find $a_n$ and $\sum_{n=2}^{\infty} a_n$.

72. Find the value of c if $\sum_{n=2}^{\infty} (1+c)^{-n} = 1$.