Solve the following problems and hand in your solutions.


For the following problems, determine if the sequences below have limits. In each case, if a limit $L$ exists, given $\varepsilon > 0$, find $N$ such that for $n \geq N$ one has $|x_n - L| < \varepsilon$.

(6) $x_n = \frac{5^n}{2n}$.

(7) $x_n = \frac{1}{n^2} + \frac{2}{n^2} + \ldots + \frac{n}{n^2}$.

(8) $x_n = (-1)^{2n-1} \left(1 - \frac{1}{2^n}\right)$.

(9) $x_n = \frac{5n^3 + n^2 - 4}{n^2 + 1}$.

(10) $x_n = \frac{3n^2 + 1}{n^2 + 1}$.