(A-29) Find the Taylor series of $f(x) = \ln(1 - x - 2x^2)$, and its convergence interval.

(A-30) $f : (0, \infty) \rightarrow \mathbb{R}$ is differentiable. If $\lim_{x \to \infty} f(x)$ and $\lim_{x \to \infty} f'(x)$ both exist, then prove that $\lim_{x \to \infty} f'(x) = 0$.

(A-31) Suppose that $f(x)$ is continuous on $[a, b]$, and $f(x)$ is twice differentiable in $(a, b)$. Prove that there exists $c \in (a, b)$ such that

$$f(b) - 2f\left(\frac{a + b}{2}\right) + f(a) = \frac{1}{4}(b - a)^2 f''(c).$$

Homework 11: due April 27 (Monday) 10am
Required problems: 29.1(bde), 29.2, 29.13, 29.15, 30.1(d), 30.4(d), 30.5(c), 31.5, A-29
Optional problems: 29.14, 29.18, 30.6, 31.6, A-30, A-31