Math 403, Homework 10

Due: Monday, April 24 in class.

**Problem 1:** Define the rational function

\[ f(z) = \frac{3z^2 + z - 1}{z^3 - 3z + 2}. \]

(a) Write \( f(z) \) as a sum of its principal parts.
(b) Find the power series of \( f(z) \) centered at 0 and determine its radius of convergence.
(c) Find the Laurent series of \( f(z) \) on the annulus \( 1 < |z| < 2 \).
(d) Find the Laurent series of \( f(z) \) on the annulus \( 2 < |z| < \infty \).

3.1: 20
3.2: 2, 6, 10
3.3: 4 (a)-(c), 10