Name: ___________________________    PID: ___________________________

**Problem 1** (3 points). Let \( p(z) = 3z^2 + 8z - 3 \). Find the horizontal intercepts of \( p(z) \) using the quadratic formula. Simplify as much as possible.

**Problem 2** (7 points). Let \( f(x) = (x + 1)^3(x - 1)^2(x + 2) \). Another way of writing \( f(x) \) is \( f(x) = x^6 + 3x^5 - 6x^3 - 3x^2 + 3x + 2 \)

(a) What is the long-run behavior of \( f(x) \)?

(b) What is the vertical intercept of \( f(x) \)?
(c) What are the horizontal intercepts (zeros) of \( f(x) \)?

(d) What are the multiplicities of the zeros you found in part (c)?

(e) Sketch a graph of \( f(x) \). Be sure to label the vertical and horizontal intercepts.