Name: _____ Date: _____

Instructions: Please complete the following problems.

Problem 1. Fill in the blank: A number c for which $f(c) = 0$ is called a(n) _____ of the polynomial function f.

Problem 2. What is the degree of the polynomial: $f(x) = x^4 - 3x^7 + 3x - 2$

Problem 3. Describe the end behavior of: $f(x) = -x^5 + 3x^2 - x + 1$

Problem 4. Describe the end behavior of: $f(x) = -x^2(x-3)^5(x+5)^3$

Problem 5. What is the fewest number of real zeros that a polynomial with degree $n > 0$ can have? (answer as a number, e.g. 1, 2, or 3)

Problem 6. Find the zeros of the polynomial: $f(x) = 5x^3 - 45x$

Problem 7. Find the multiplicity of each zero: $f(x) = x^3(x-5)^2(x+8)^9$ (in order from left to right)

Problem 8. Find whether the graph crosses or touches each zero: $f(x) = (x-2)^2(x+3)^3$ (in order from left to right)

Problem 9. Without graphing, can you prove that there is a zero between $x = -1$ and $x = 1$ of $f(x) = -x^3 - x + 3$?

Graphs: Please complete the following problems to practice your graphing skills.

Find: (a) degree, (b) leading coefficient, (c) end behavior, (d) zeros, (e) multiplicity, (f) cross/touch, (g) y-int, (h) NLT, and then (i) sketch.

Problem 10. Graph: $f(x) = x^3(x+2)^2(x-5)^3$

Problem 11. Graph: $f(x) = -(x+3)^2(x-1)^3$

Problem 12. Graph: $f(x) = x(x+5)^2$

Problem 13. Graph: $f(x) = -x^2(x-2)^3(x+3)$