Objective: Determine the end behavior of a polynomial function. [10]

40. Describe the end behavior of the graph of $f(x) = -4x^8 - 19x^5 + 52x^2 - 17x + 100$.

$-4x^8 \longrightarrow$ Down Left / Down Right

41. Describe the end behavior of the graph of $f(x) = x^3 - 3x^2 - 9x - 17$.

$x^3 \longrightarrow$ Down Left / Up Right

42. Describe the end behavior of the graph of $f(x) = -3x^2(x+.1)(x^2+1)$.

$-3x^5 \longrightarrow$ Up Left / Down Right

Objective: Use intercepts and end behavior to graph a polynomial function. [9,10]

43. Consider the polynomial $f(x) = -x(x-2)^3(2x+1)^2$.

(a) Determine the degree of f and the leading coefficient.

Leading Term $= (-x)(x)^3(2x)^2 = -4x^6 \longrightarrow$ Degree is 6. Leading coeff is -4.

(b) State the zeros of f and their corresponding multiplicities.

$x = 0$, mult 1; $x = 2$, mult 3; $x = -\frac{1}{2}$, mult 2

(c) Describe the end behavior of the graph of f.

$-4x^6 \longrightarrow$ Down Left / Down Right

(d) Determine the y-intercept.

$x = 0 \Rightarrow f(0) = -(0)(-2)^3(1)^2 = 0$ $\quad (0,0)$

(e) Roughly sketch the graph of f. Be sure that your graph correctly illustrates the y-intercept, the end behavior, and the behavior near the x-intercepts.