## Bounce, Wiggle, Cross

Directions:

1) Use the following window values:
   [x min,x max] = [-3, 4]      [y min,y max] = [-100, 100] yscl = 0

2) Graph each f(x) on your calculator.

3) Sketch the graph on the chart. Do not worry about the scale. We are only interested in the end-behaviors and the behavior at the x-intercepts.

4) Fill in the remaining columns of the chart based on the information you see on your graph.

After completing the table:

1) Look at each root where the graph of f(x) "crossed" the x-axis. What was the power of the corresponding factor?

2) Loot at each root where the graph of f(x) wiggled at the x-axis. What do you notice about the power of the corresponding factor?

3) Look at each root where the graph of the f(x) is tangent or bounced at the x-axis. What do you notice about the power of the corresponding factor?

4) If f(x) has the highest powered term $ax^n$, describe the end behavior of the f(x) in each of the following situations:

   a>0, n is even: ________________________

   a< 0, n is even: _______________________

   a>0, n is odd: ________________________

   a< 0, n is odd: _______________________

## Bounce Wiggle Cross Extension

Calculus Connection:

A particle starts at time t = 0 and moves along the x-axis so that it's position at any time $t \geq 0$ is given by the $x(t) = (t - 1)^3(2t - 3)$.

For what values of t is the velocity of the particle less than zero?
(Hint: factor the algebraic expression, then sketch a quick sketch using the x-intercepts and the behavior of the exponents to find where the function is <0)

$$V(t) = 2(t - 1)^3 + 3(t - 1)^2(2t - 3)$$