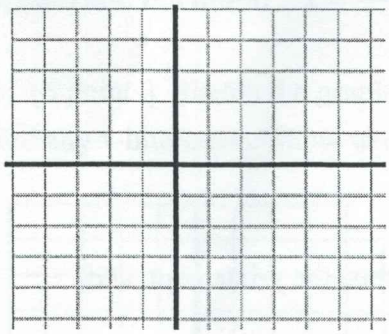
8. [10 points] Write the graph of the function, $f(x) = x^4 - 2x^3 - 15x^2$ in factored form. Then sketch the graph ing x-intercepts, the y-intercept, and end behavior. Verify your result using your graphing calculator.



9. The length of a pendulum is directly proportional to the square of the period (length of time of one swing).

   a. [4 points] Express this proportionality with an equation.

   b. [4 points] Suppose a pendulum that is 5 feet long has a period of 1 second. Write the formula for length, L, as a function of the period, P, of the pendulum.

   c. [10 points] Find the inverse formula, $P(L)$, and compose the two functions to demonstrate that they are truly inverse functions.

10. [4 points] Write the rational expression in factored form. Reduce the expression if possible. Show work.

$$\frac{x^2 + 7x + 12}{x^2 + 4x}$$