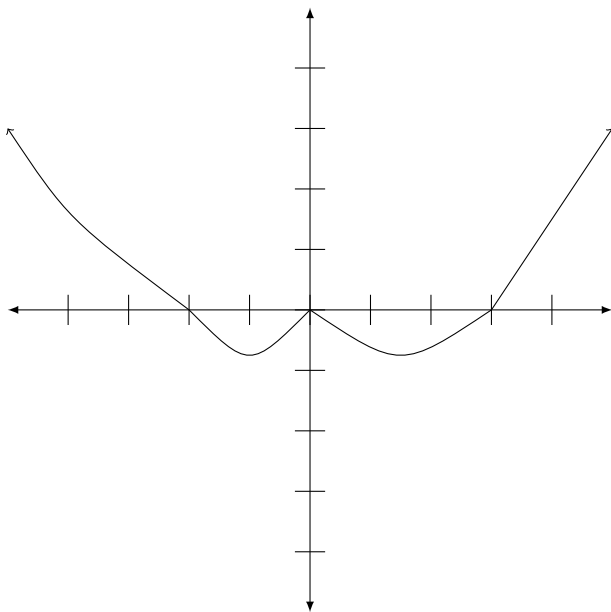


Quiz 10

1. Sketch a graph of $f(x) = x^4 - x^3 - 6x^2$. Label all intercepts.

Answer. First, factor to get $f(x) = x^2(x^2 - x - 6) = x^2(x - 3)(x + 2)$. Then plot the zeroes $-2, 0, 3$. Since the leading coefficient is positive and the degree is even, the ends go up. The multiplicities of each zero tell us that the graph crosses at -2 and 3 , and doesn't cross at 0 . Combining this gives:



□

2. Hannah sells shoes, and wants to make as much money as she can. If the shoes cost p dollars, then $300 - p$ people will buy them. How much should she charge for each shoe? How much will she make? (hint: $x = 300 - p$ and $R = px$)

Answer. Plug in the price equation into the revenue equation. This gives

$$R(p) = p(300 - p) = -p^2 + 300p.$$

This is a parabola opening down, so the maximum revenue will happen at the vertex. Plugging this in to $-b/2a$ gives that the x value of the vertex is $-300/-2 = 150$. This means that she should set the price at \$150 for each pair of shoes. Plugging this all in to the revenue equation gives \$22500 total.

□