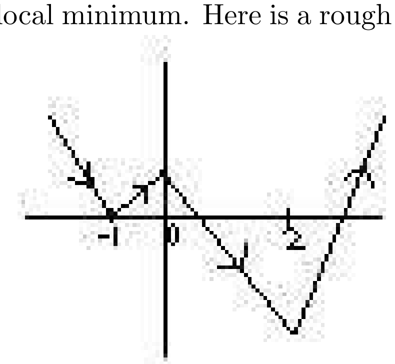
This chart is formed as follows: I think the first row (x-row) as the real line. On the very left we have $-\infty$ and as we move towards right the numbers get bigger and on the very right we have $+\infty$. In the F' row: I have "zeros" in the middle of each vertical line emanating from each of the critical values on the top row indicating the fact that these values make the derivative equal to zero. I have determined the signs in this row (F' row) by picking up test points from each interval and plugging it into the derivative and checking the sign. For example from the interval $(-\infty, -1)$ I picked up $x = -2$, then $F'(-2) = 12(-2)(-2+1)(-2-2) < 0$, hence I have the negative sign (-) between $-\infty$ and -1, similarly from the interval $(-1, 0)$, I picked up $x = -1/2$, then $F'(-1/2) = 12(-1/2)(-1/2+1)(-1/2-2) > 0$, hence I have the positive sign (+) between -1 and 0. The rest of the derivative row signs completed in a similar manner. Then for F row I have used the information from the first theorem; when the derivative is negative function is decreasing and when it is positive it is increasing. So F is decreasing ($\searrow$) on the intervals $(-\infty, -1)$ and $(0, 2)$ and it is increasing ($\nearrow$) on the intervals $(-1, 0)$ and $(2, \infty)$

Now, by using the First Derivative Test we can classify the critical points as follows: $x = -1$ is a local minimum, $x = 0$ is a local maximum and $x = 2$ is a local minimum. Here is a rough sketch of $F(x)$ based on this investigation:



Example Find where the function $F(x) = \frac{(x-1)^2}{(x+1)}$ is increasing and decreasing and classify the critical points of F.

The first step is the same; find the critical points first. One of the critical points is easy to recognize from the function itself because the function $F(x)$ is not defined at $x = -1$ hence it is not differentiable at this point. So $F'(-1)$ does not exist, meaning $x = -1$ is a critical point. To find the rest of the critical points I need to do the work.