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1. Using derivatives, find the critical points of $f(x) = x^3 - 3x + 7$

   Solution.

   $$\frac{df}{dx} = 3x^2 - 3 = 3(x^2 - 1) = 3(x - 1)(x + 1)$$

   This is equal to zero precisely when $x = \pm 1$. Thus our critical points are $x = \pm 1$.

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2. Classify the critical points from Problem 1. (Are these local maxima or local minima?) Justify your answer. ("I graphed it" does not count!)

   Solution.

   - x = 1
     At $x = 1$, $\frac{df}{dx}$ changes from negative to positive, so by the First Derivative Test this is a local minimum.
   - x = -1
     At $x = -1$, $\frac{df}{dx}$ changes from positive to negative, so by the First Derivative Test this is a local minimum.