

**Let**  $f(x) = x^4 - 2x^3 - 5x^2 + 12x - \pi$

1. Find the critical points of  $f$  by hand      *Hint:* One is  $x = 1$
2. On which intervals is  $f$  increasing? decreasing?
3. Find the inflection points of  $f$
4. On which intervals is  $f$  concave up? concave down?
5. Sketch a graph of  $y = f(x)$
6. Verify your graph by using technology