

Math 170: Worksheet 4

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Problem 1. Compute the derivative of the following function:

$$f(x) = (x + 1)^3.$$

Hint: expand the expression of $f(x)$ by FOILing.

Problem 2. Factorize the polynomial $p(x)$, where

$$p(x) = x^4 - 2x^3 + 2x^2 - 2x + 1,$$

If it is known that $(x^2 + 1)$ is a factor of $p(x)$.

Problem 3. Let $p(x)$ be the polynomial above. Find $p'(x)$. Factorize $p'(x)$, if it is known that $(x - 1)$ is a factor of $p'(x)$.

Problem 4. (extra)

- Let us consider $f(x) = (x + 1)^3$ again, and look at the polynomial $f'(x)$. Can you factorize this?
- After you're done with the factorization, now consider $g(x) = (x + 1)^2$ and compute $g'(x)$.
- Using the results from above, now let's say someone gives you the polynomial $h(x) = (x + 1)^{10}$. Can you guess what the derivative $h'(x)$ equals?