

MATH 1914 Hint to Exercise RevCh2/11 Fall 2017

Here are two ideas how to deal with the cubic term.

- If you choose to use the definition

$$f'(a) = \lim_{h \rightarrow 0} \frac{f(a+h) - f(a)}{h},$$

then you will need to apply the binomial formula

$$(a+h)^3 = a^3 + 3a^2h + 3ah^2 + h^3.$$

- Alternatively, if you use the definition

$$f'(a) = \lim_{x \rightarrow a} \frac{f(x) - f(a)}{x - a},$$

then apply the identity

$$x^n - a^n = (x - a) (x^{n-1} + x^{n-2}a + x^{n-3}a^2 + \cdots + x^2a^{n-3} + xa^{n-2} + a^{n-1})$$

in the case $n = 3$.