

Differentiation Rules (3.3)

Expected Skills.

At the end of this section, students will be able to:

- correctly use the differentiation rules presented in the section (derivative of a constant, power rule, constant multiple rule, sum rule, natural exponential rule, product rule, quotient rule),
- compute the equation of the tangent line at a given point using these rules.

Pre-Class Activity (ch3-derivatives-2-rules-1-pc). The goal of the pre-class activity is to have the students compute a derivative using the definition of the derivative and seeing how long or “painful” it can be. This is thus conceived as a motivation for having differentiation rules.

Alternatively, one can ask the students to prove one of the differentiation rule (still using the definition of the derivative): the rule for $f(x) - g(x)$ seems to be a good compromise as it is not too difficult to prove and it is not presented directly in the textbook. This other activity would serve the same purpose but would focus a bit more on how we “come up” (i.e. prove) with differentiation rules.

If you don't use it as a pre-class activity, then it could be good to prove one rule in class.

The second question simply ask the students to list the rules presented in the textbook to make sure they have all of them when they come to class and can use them directly to solve exercises.

Worksheet (ch3-derivatives-2-rules-2-ws). The goal of the activity is to have the students use differentiation rules on more and more “difficult” cases.

We then ask them to compare using the quotient rule with “simple” fractions. The goal is to have them realize that in such situations it is easier to simplify the fraction or write the variable with a negative exponent rather than using the quotient rule.

The last part focuses on having the students being able to justify why $(f(x)g(x))' \neq f'(x)g'(x)$.