

- Topic: More on definition of derivatives, differentiation laws
- **Homework:** Watch videos 3.6, 3.7, 3.9, and 3.10 for Tuesday and 3.11, 3.12 for Wednesday.

Let

$$g(x) = \frac{2}{\sqrt{x}}$$

Calculate $g'(4)$ directly from the definition of derivative as a limit.

Without using a calculator, estimate $\sqrt[20]{1.01}$ as well as you can.

Hint: Consider the values you know for $f(x) = \sqrt[20]{x}$ and its derivative.

Product of 3 functions

Given f_1 , f_2 and f_3 differentiable on \mathbb{R} , what can you say $(f_1(x)f_2(x)f_3(x))' = ?$

Higher order derivatives

Let $g(x) = \frac{1}{x^3}$.

Calculate the first few derivatives.

Make a conjecture for a formula for the n -th derivative $g^{(n)}(x)$.

Prove it.

Compute the derivative of the following functions:

① $f(x) = x^{100} + 3x^{30} - 2x^{15}$

④ $f(x) = \sqrt{x}(1 + 2x)$

② $f(x) = \sqrt[3]{x} + 6$

⑤ $f(x) = \frac{x^6 + 1}{x^3}$

③ $f(x) = \frac{4}{x^4}$

⑥ $f(x) = \frac{x^2 - 2}{x^2 + 2}$