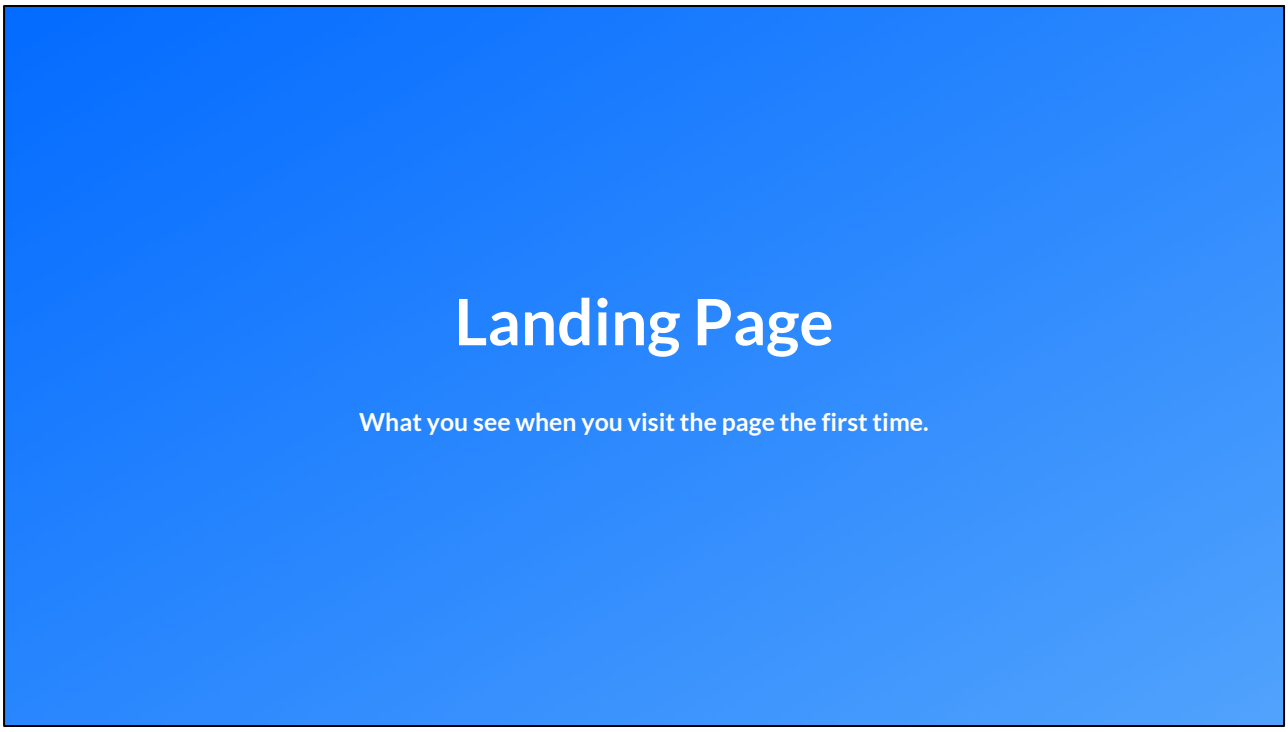
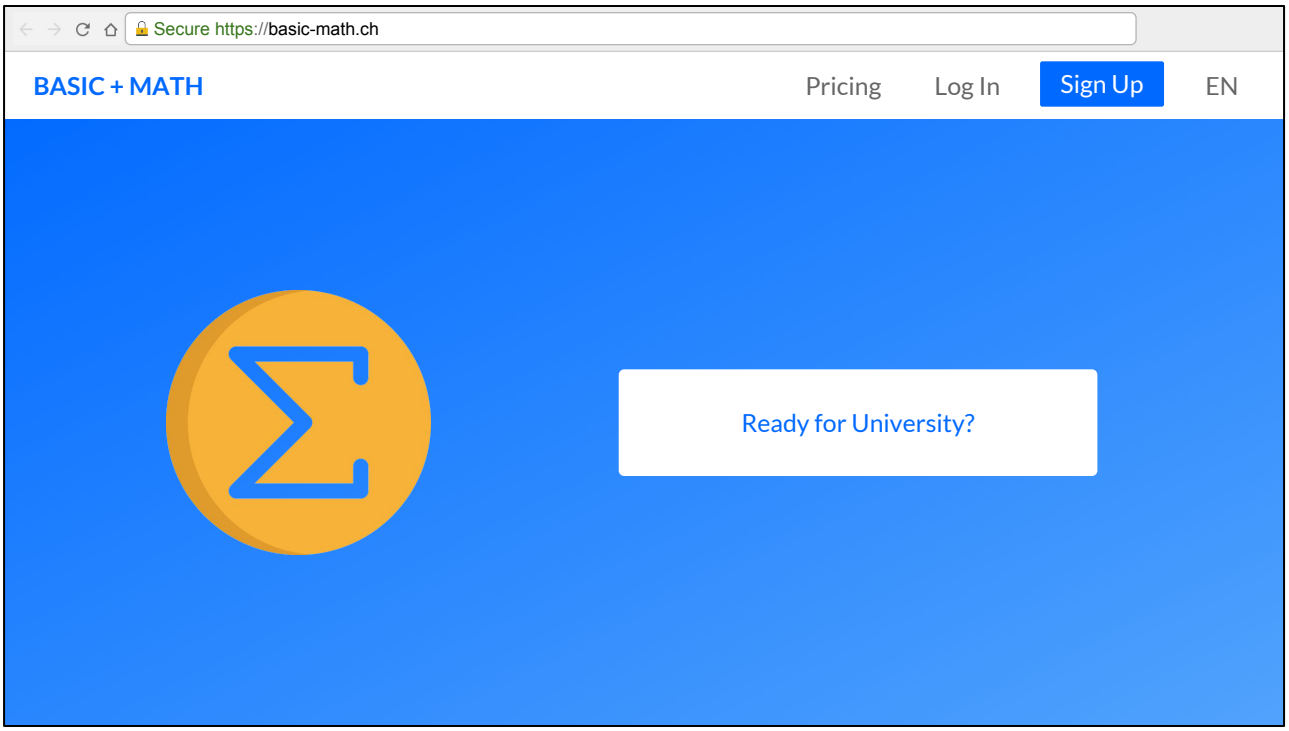
# BASIC + MATH

**Wireframes**: A first draft of what a website could look like.

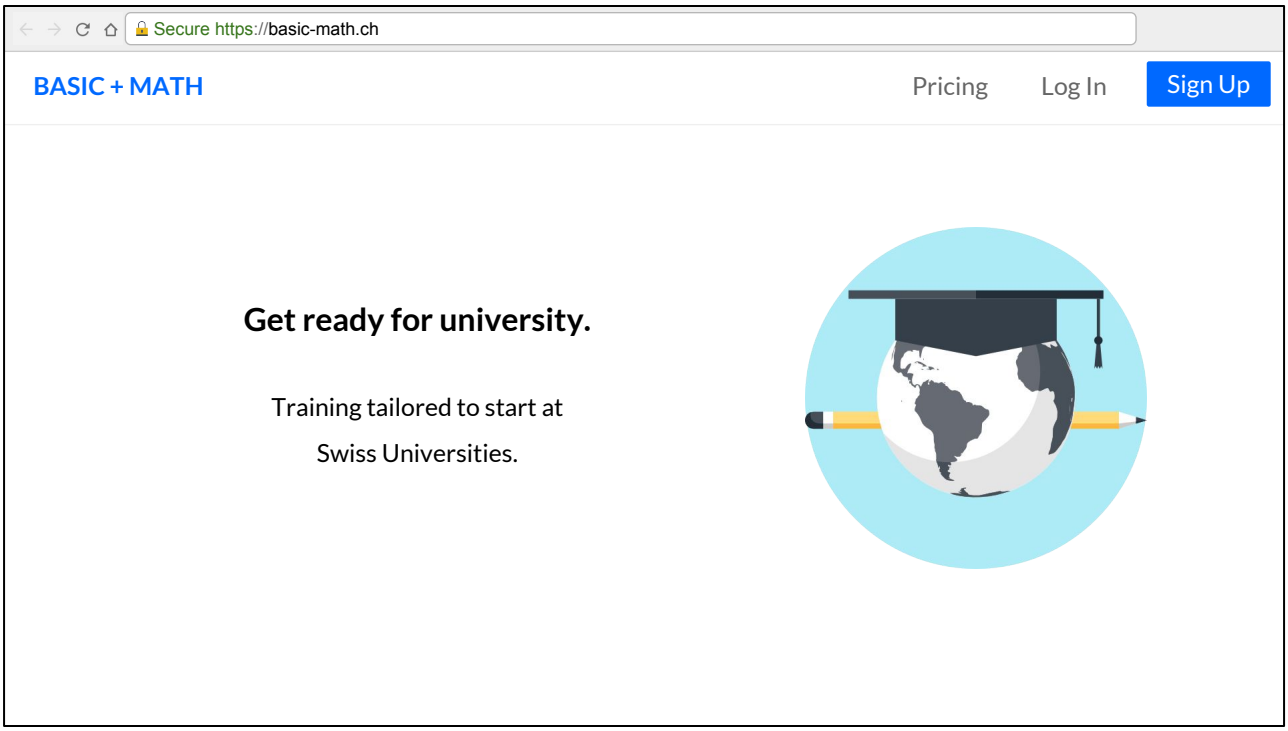
Wireframes serve the purpose of giving the stakeholders an idea of what the project will look like when materialized early on. Through this, ideas can be discussed and changed at low cost.



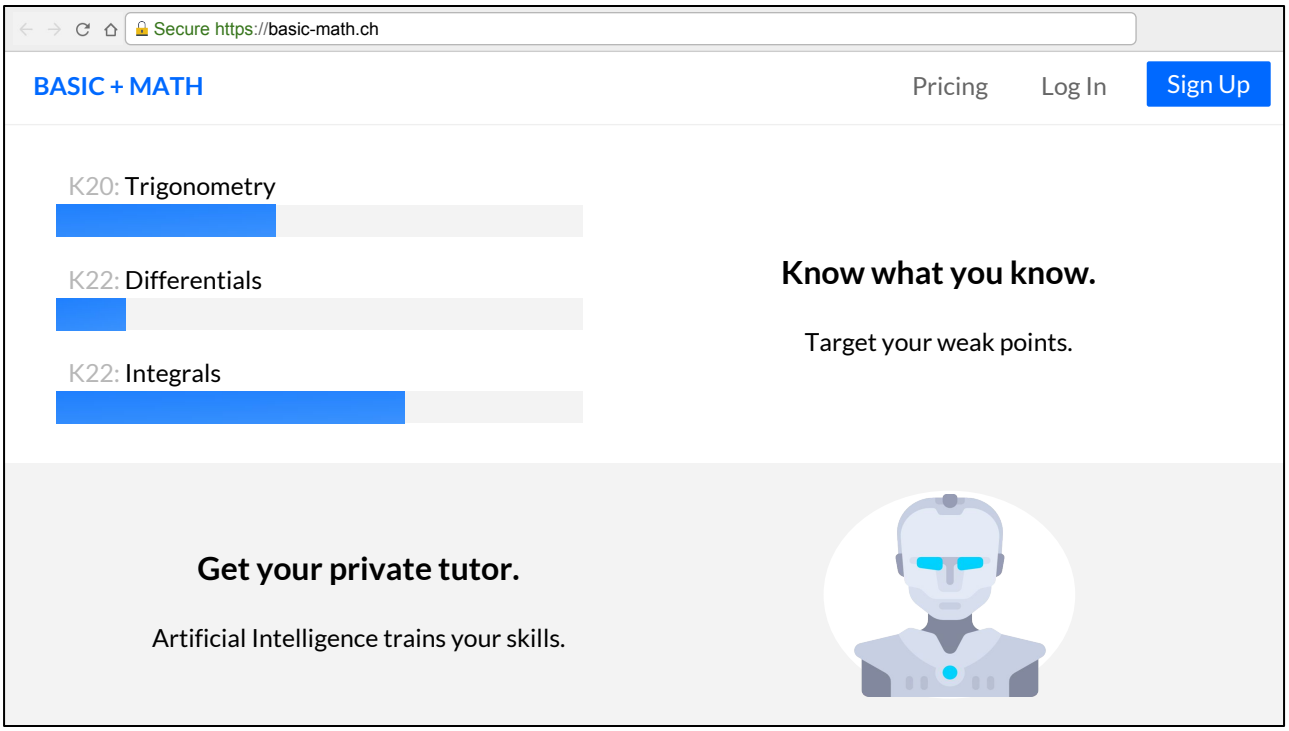

The landing page is what a user sees when he enters “basic-math.ch” in his browser for the first time. Depending on the users’ system settings, the language is automatically determined (EN, DE or FR).

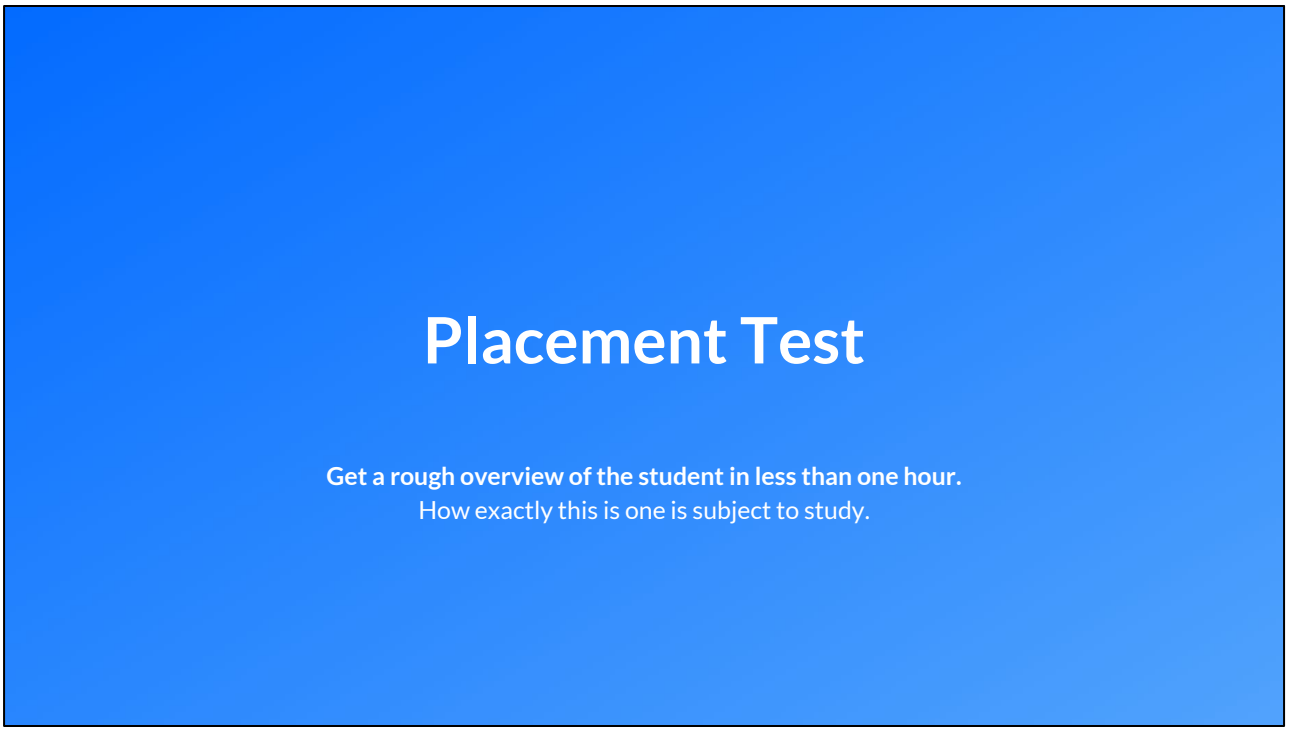



The very first thing the user will see on the landing page is the so called “above the fold” part. Usually, there’s a nice image (in our case it should be something mathematics related) and an action button. The action button should be something to “Get Started”.

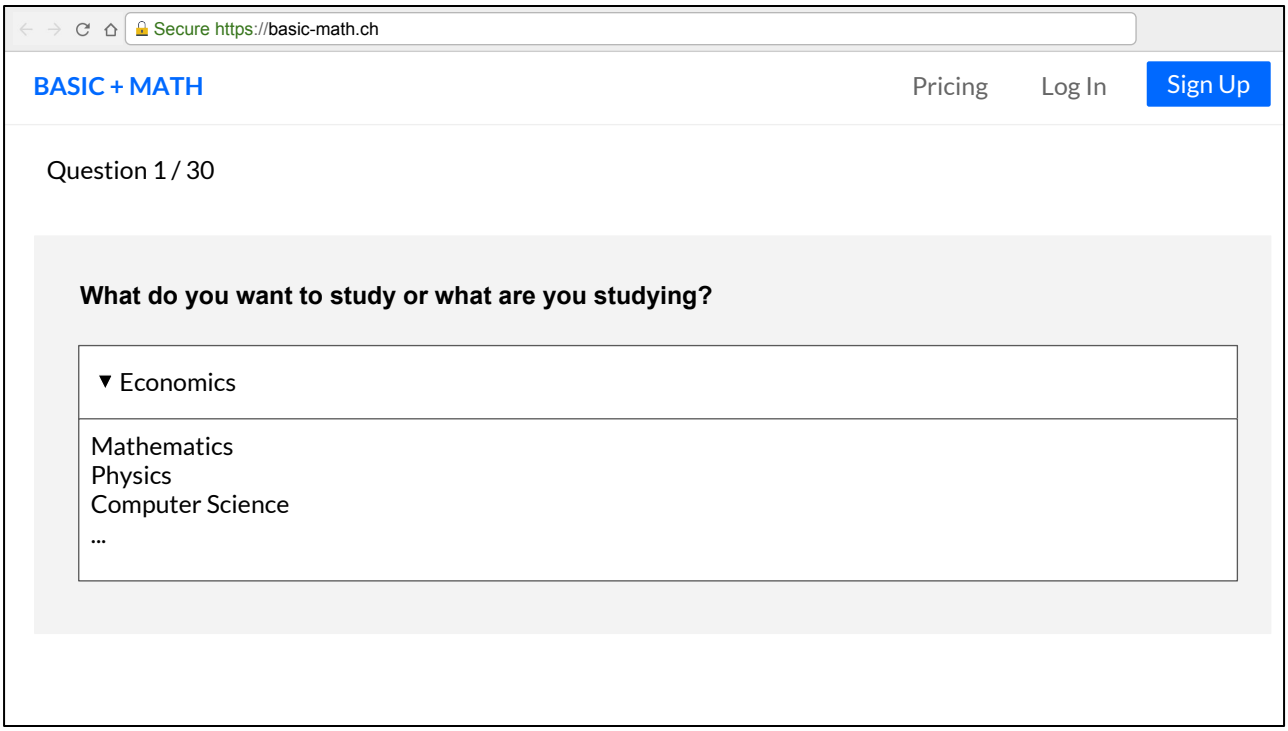



“Below the fold” are the value propositions of the website.

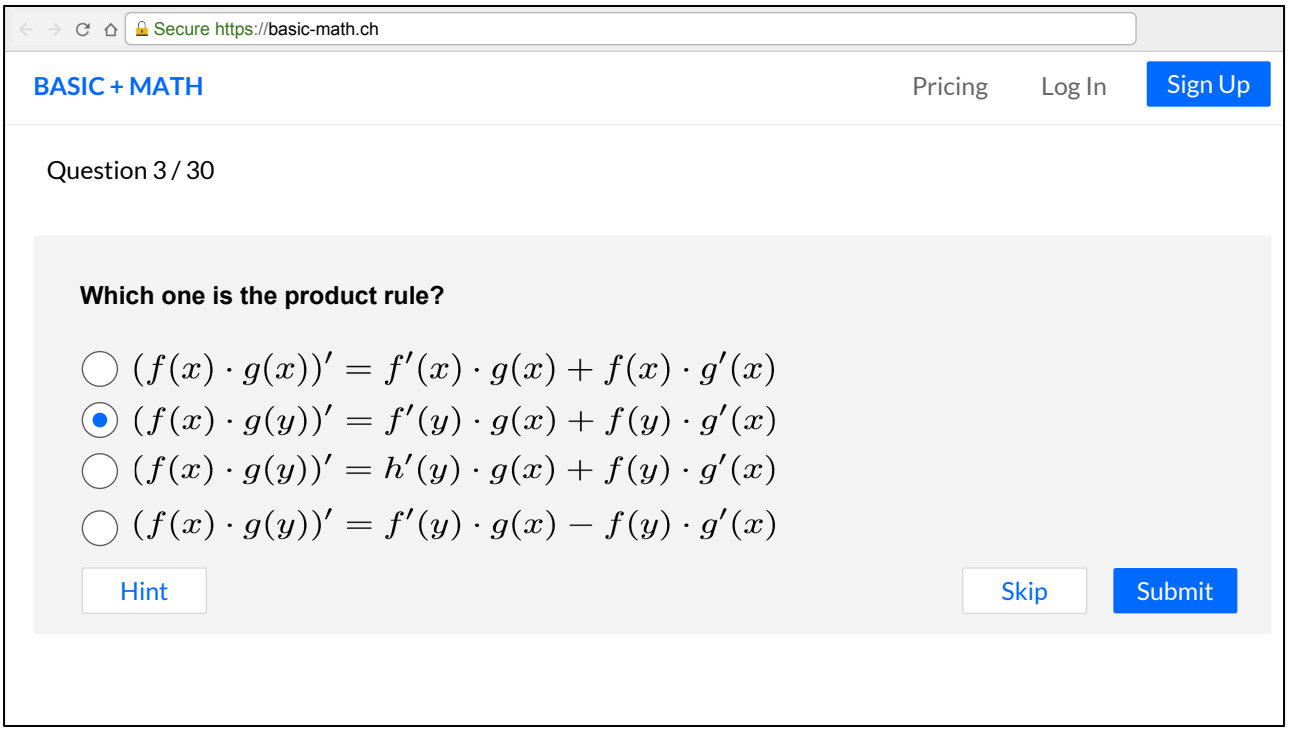

Secure https://basic-math.ch
BASIC + MATH
Pricing
Log In
Sign Up
K20: Trigonometry
K22: Differentials
K22: Integrals
Know what you know.
Target your weak points.
Get your private tutor.
Artificial Intelligence trains your skills.




Similar to duolingo.com, our action button is a placement test. The user can do it **even before registration,** which lowers barriers to entry. After the user has completed a placement test, chances of registration are significantly increased.




As a central aspect of the platform, the student selects which subject he wants to work on. Since the required mathematical foundations vary for different fields of study, the targeted skills on the platform should vary accordingly. A first indication of what is important for which field of study can found in Schlussbericht.

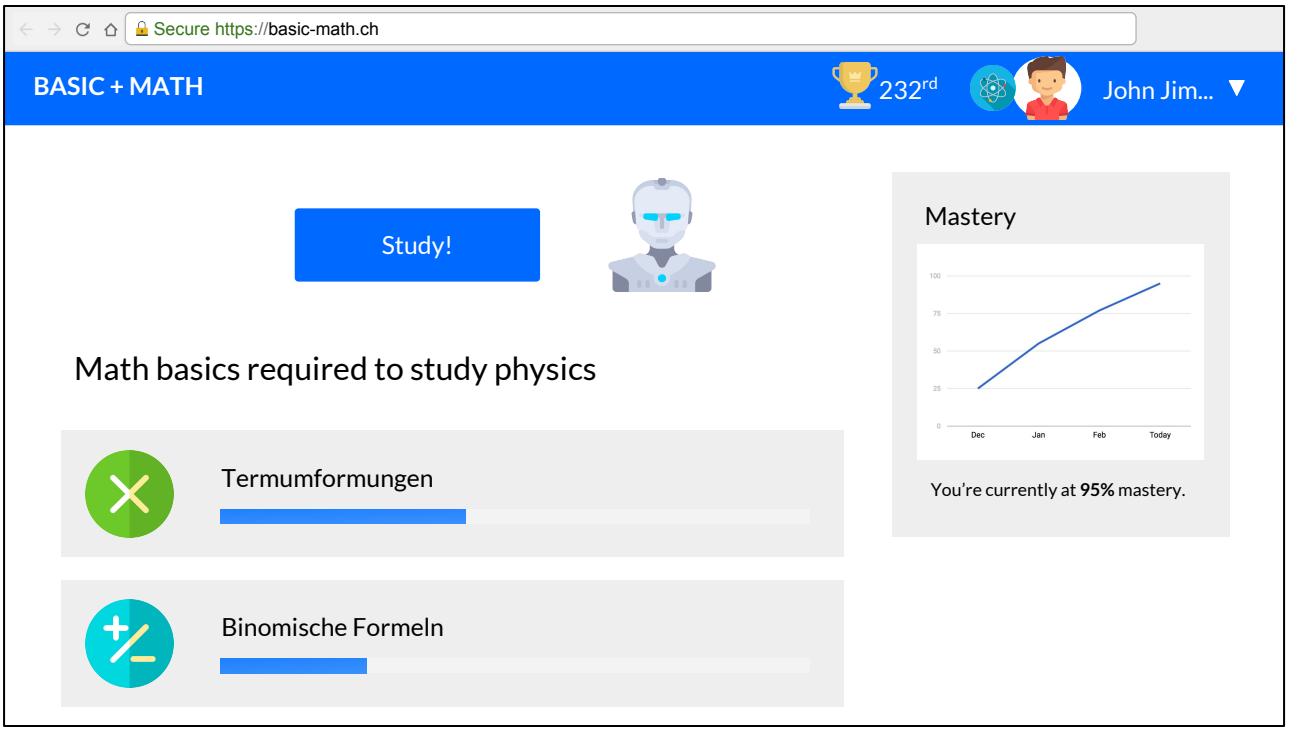



What exactly this placement test will look like is open and subject to discussion and research. In a best case scenario, the placement test is improved with data generated from the in-use product. However, until then, a first guess at a reasonable placement test has to be done. The idea is that the intelligent tutor rapidly detects skills and adjusts accordingly.


Thinking out of the box could be an option to speed up the placement test.

# Dashboard

What the student sees when he / she logs in.

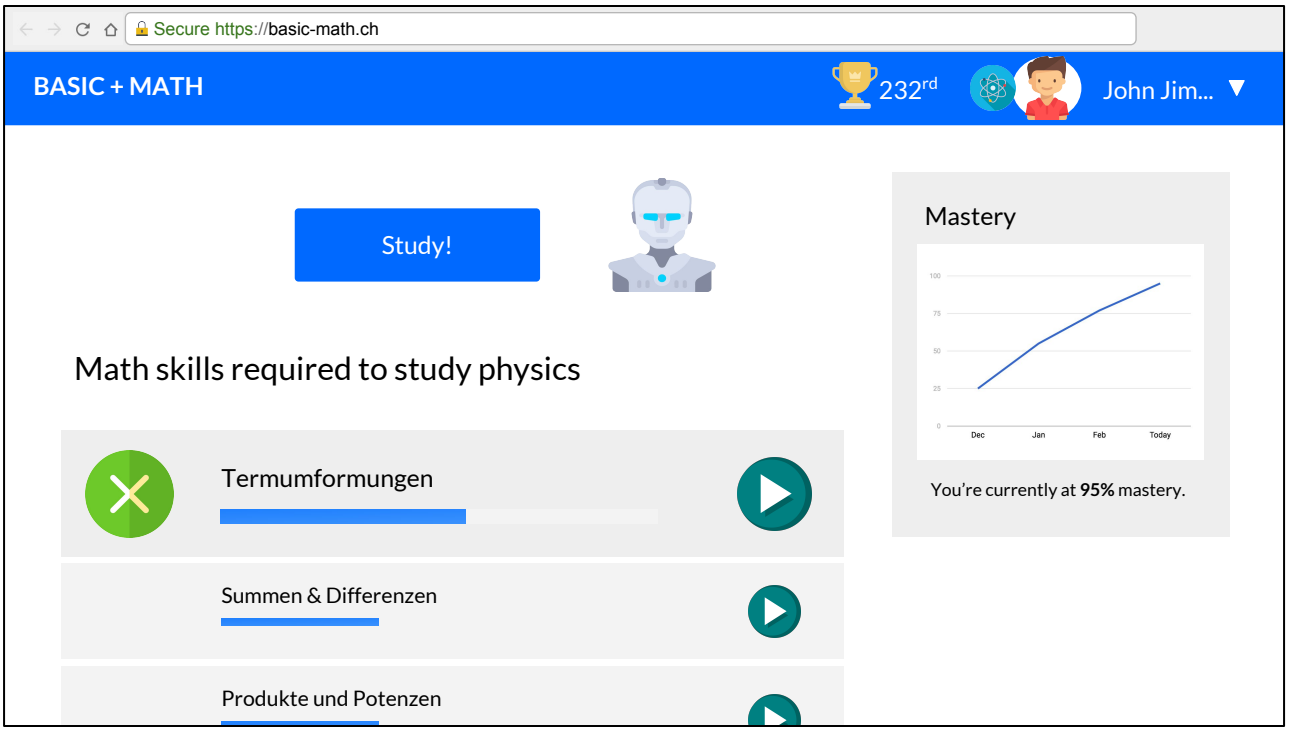



The dashboard consists of three main parts.

First, a button that says “Study!” will start a training session with content our recommender system deems best for the student. The student doesn’t have to select content himself; the suggestions are selected automatically.

Second, the student gets an overview of all math topics that are relevant to the subject he wants to study. The topics have progress bars to visualize where the student stands. The topics are clickable; when clicked, the subtopics are shown (see next slide).

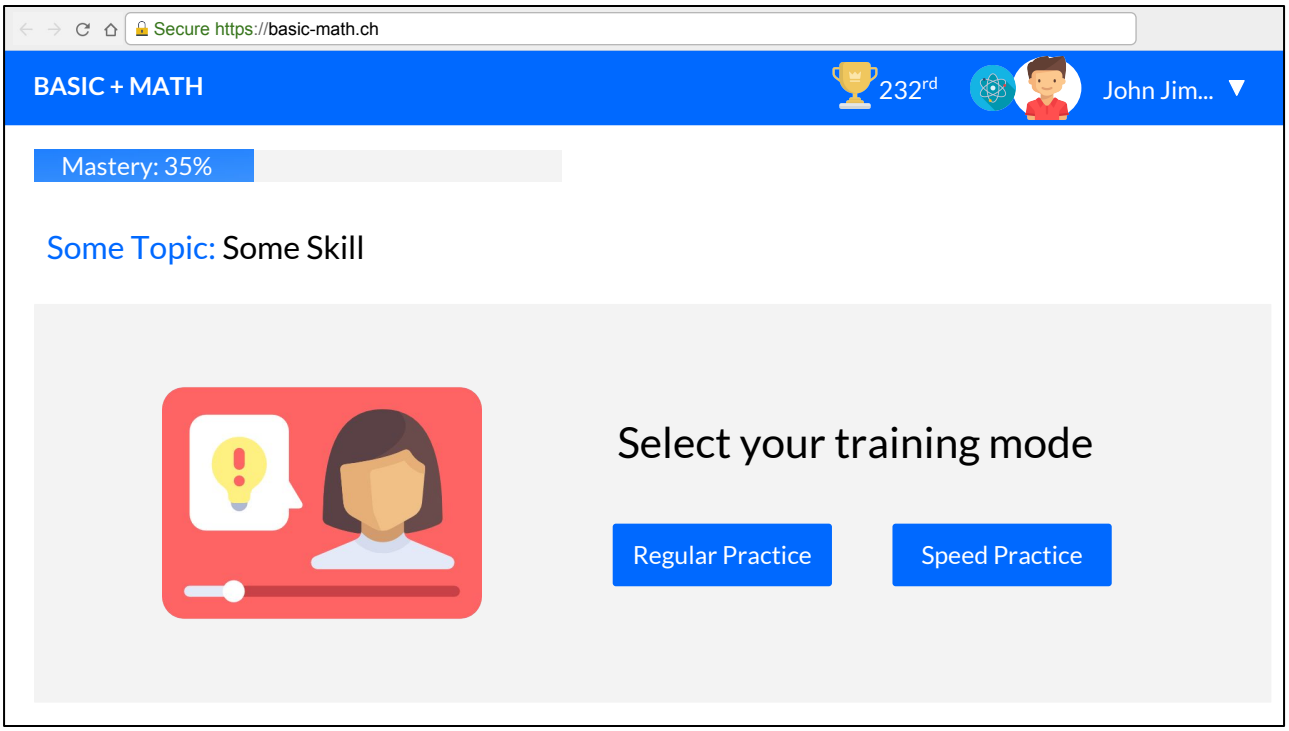
Third, a sidebar gives the user information about his overall progress (mastery) and other useful information.



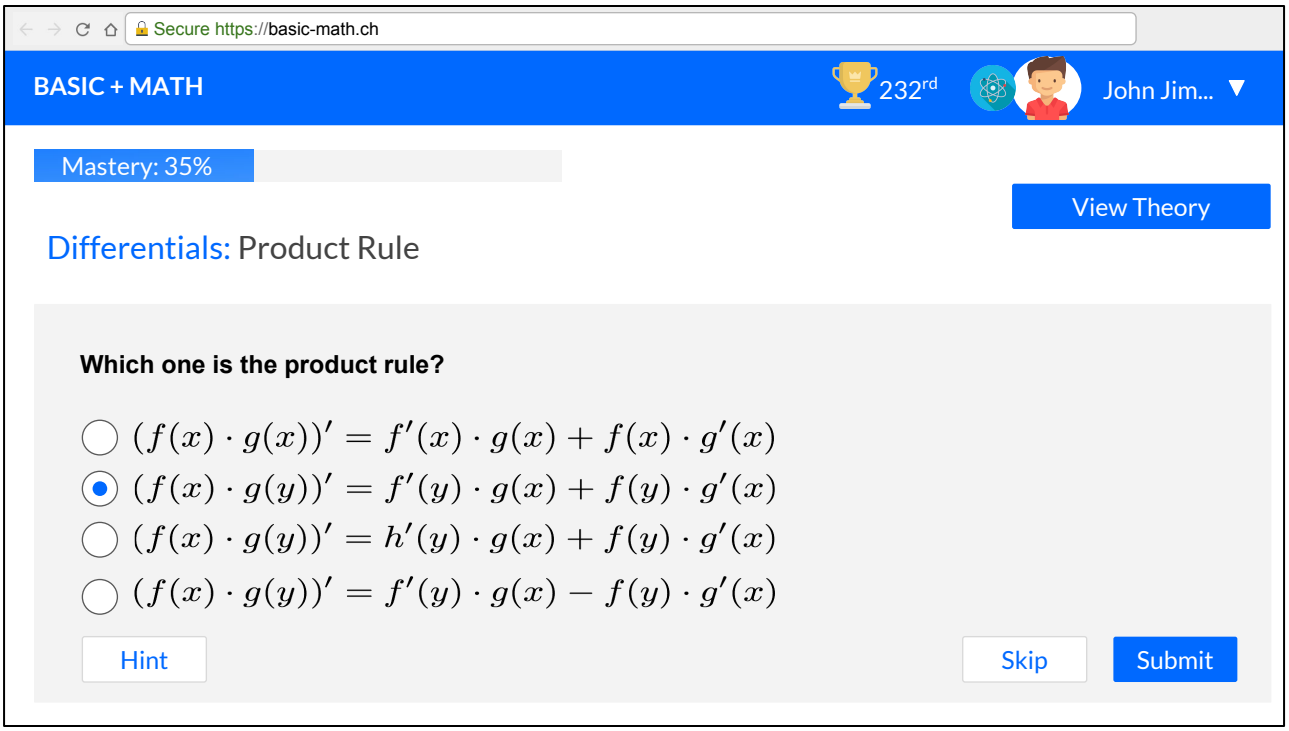

Here's the view of the unfolded topic with its subtopics.

# Practice

What a training session looks like.




Before starting a training session, a mode can be chosen. Different training modes increase variability and prepare for different circumstances.




In a training session, the user gets a progress bar about his mastery of the current competency.

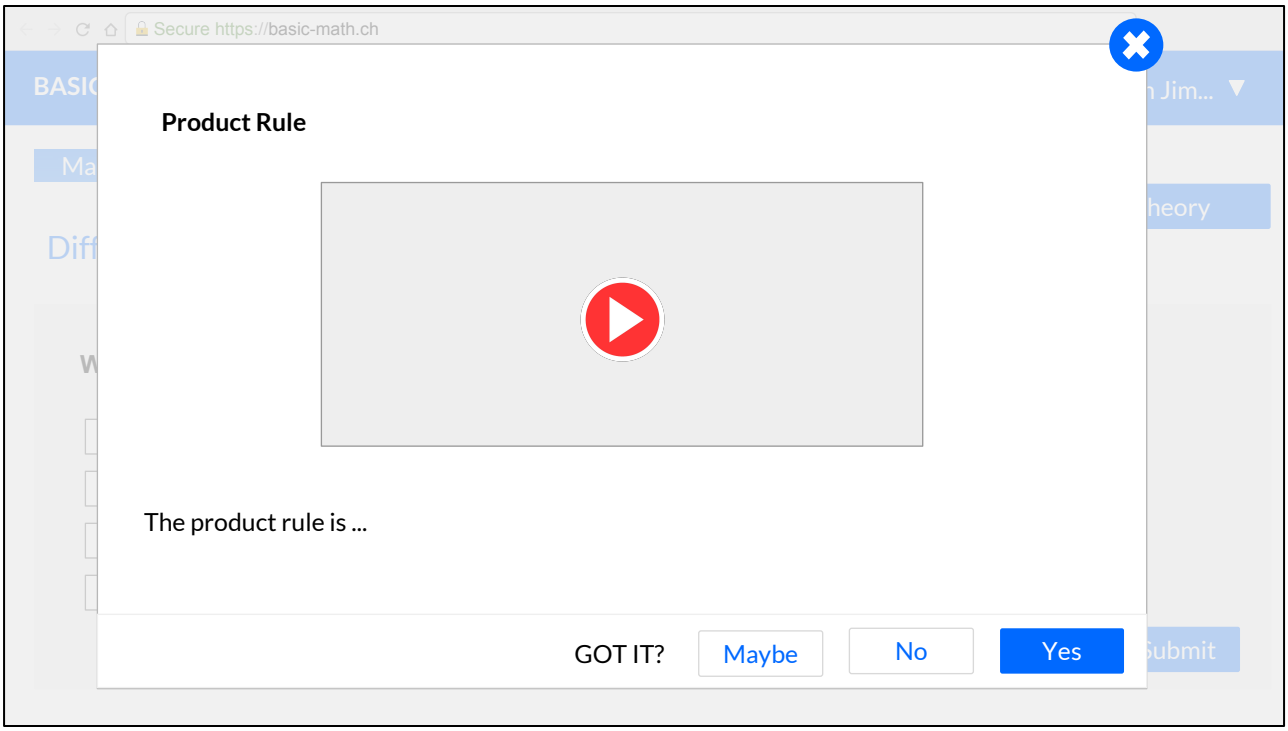
Different exercise types (Multiple Choice, etc.) are discussed on the next few slides.

The user can choose whether he wants to:

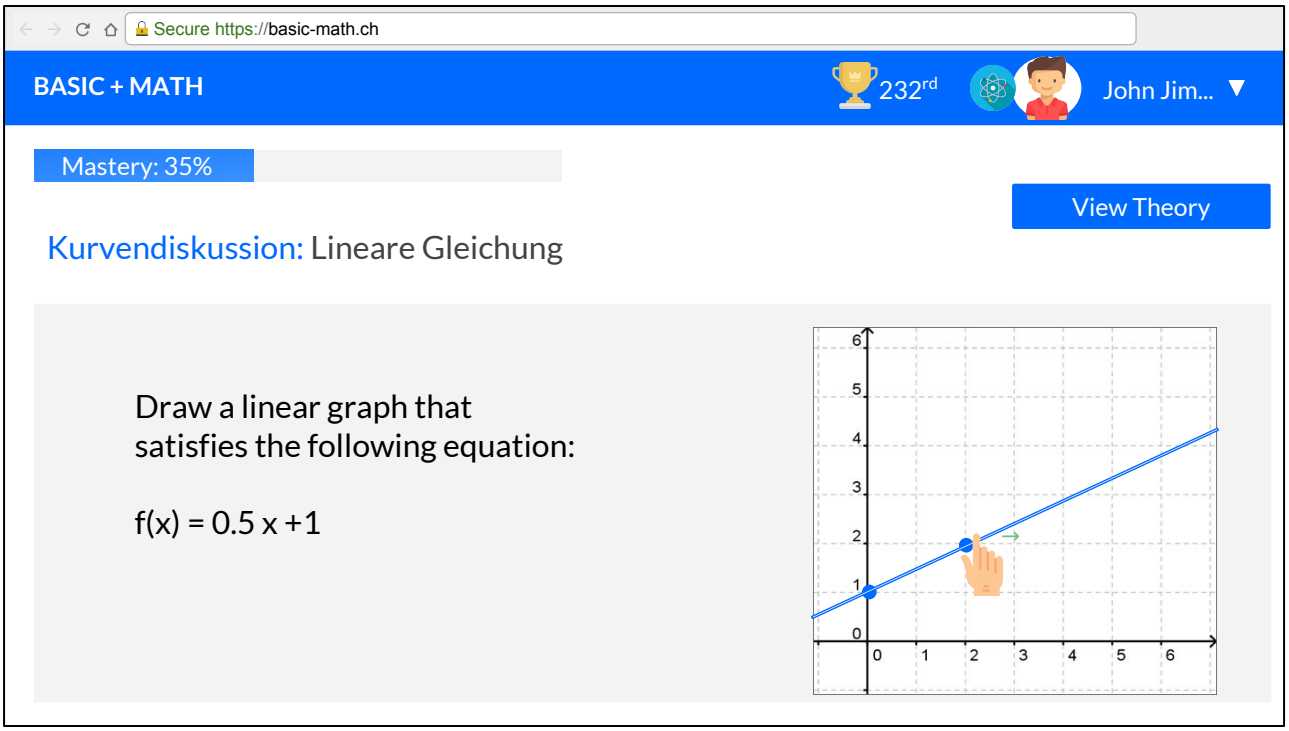
- Solve the problem directly and submit the solution
- Request a hint first
- Read the theory
- Skip the problem. When the skip button is pressed, feedback is requested regarding why the exercise was skipped (too easy? too hard? other reason?)

The knowledge tracing system tracks the interactions and adjusts the mastery level accordingly. For example, if the user enters a wrong solution, probably his mastery level will go down. How exactly the knowledge tracing algorithms work will be subject to intensive research and optimization.

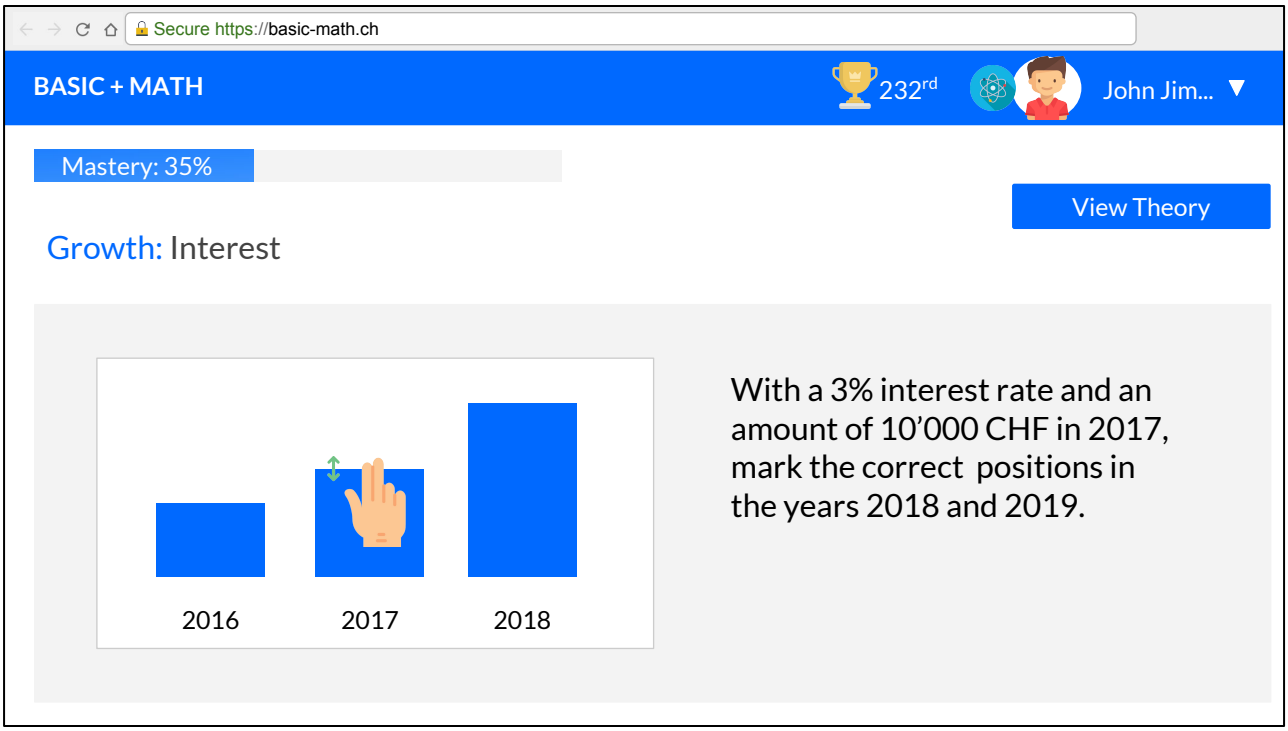
Next, we'll see what happens when the "View Theory" button is clicked (which will also be tracked, like everything else).



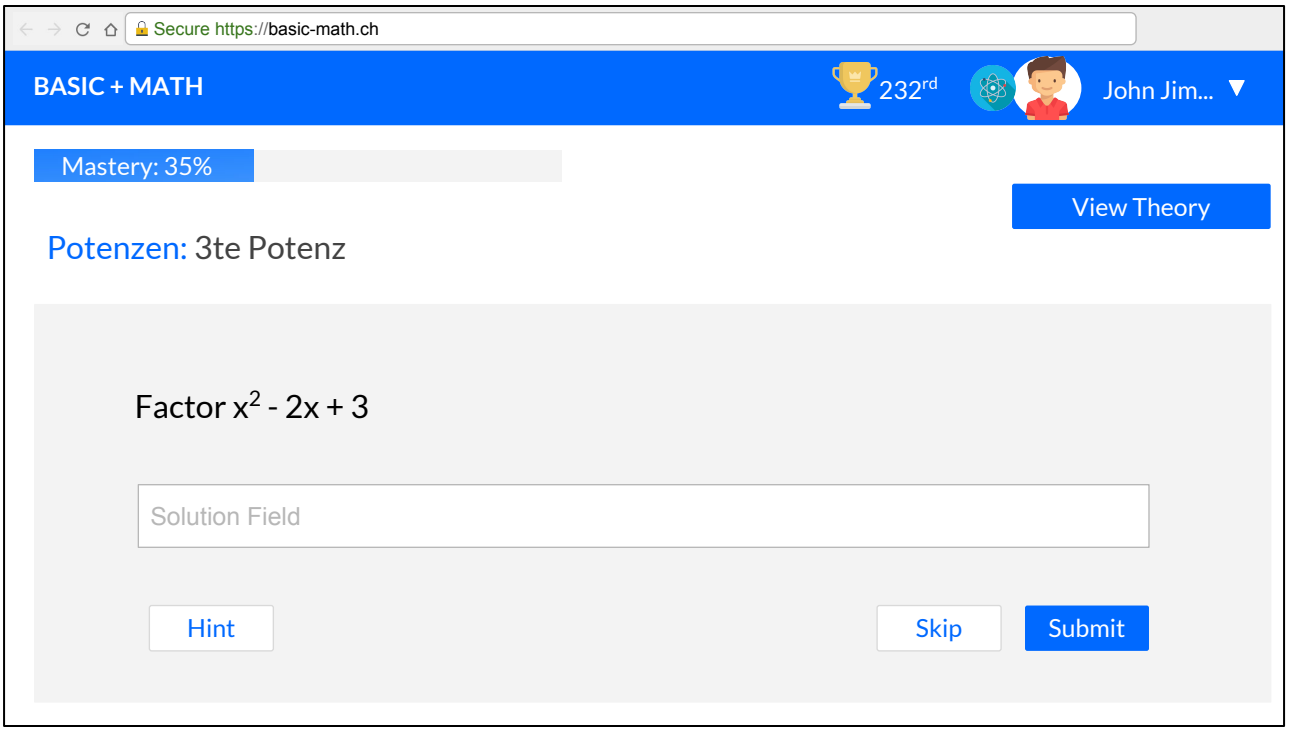

Theory will be available in a pop-up window. Additionally, data is collected regarding whether or not the student thinks he understood the theory. The theory consists of a written part and, in some cases, a video.



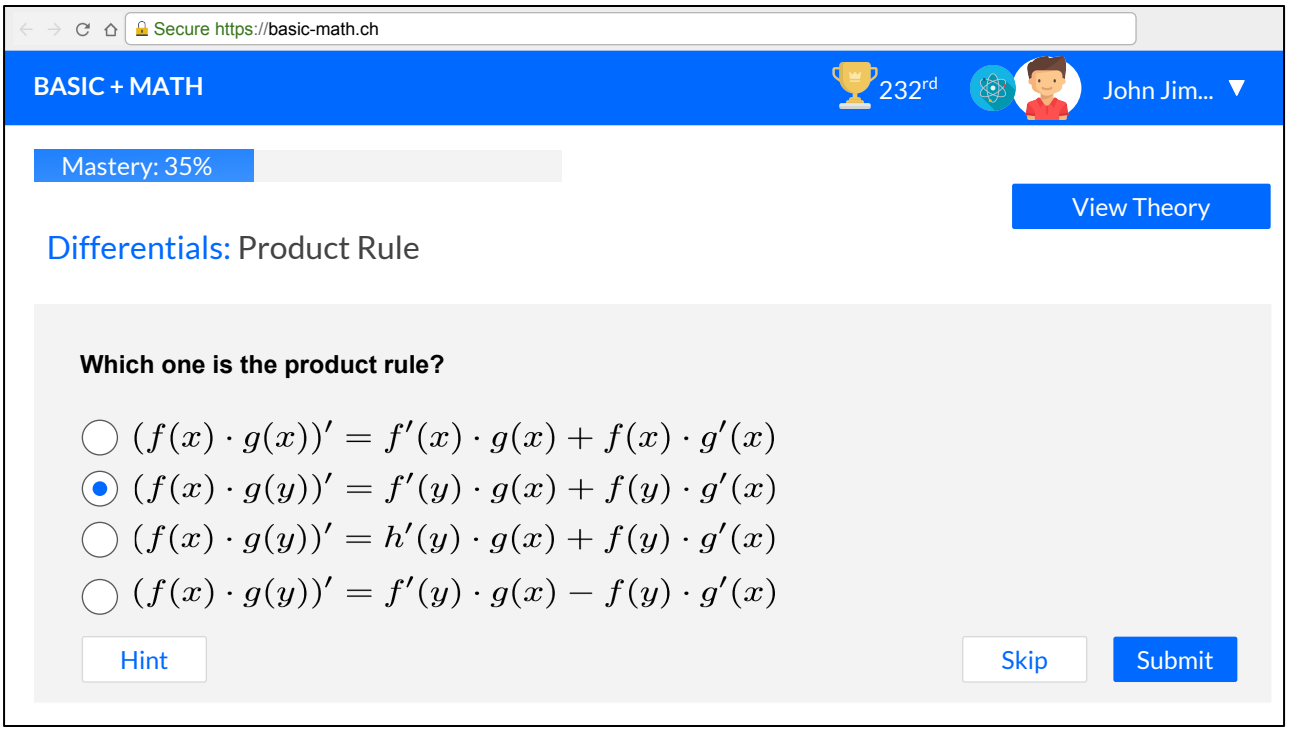

**Curves**: Allow to easily enter solutions for curve discussions. [The comment feature isn't available here, so I'm writing my comment in brackets. I'm not sure what this sentence means (there's no subject), so I'm not sure how to edit it and maintain intended meaning.]



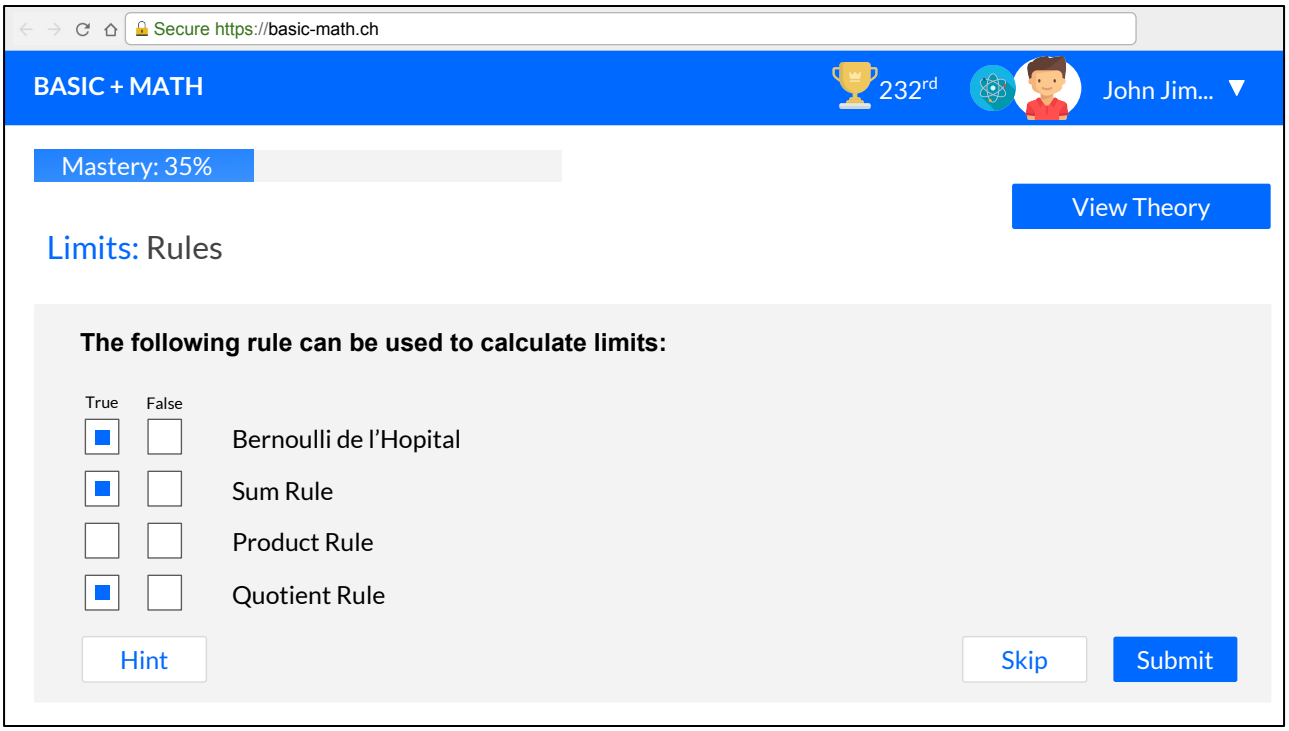

**Bar Diagrams:** Allow to easily enter solutions for cases such as growth. [Same as last slide. Do you mean “Allows the student to student to easily enter solutions for cases such as growth?” And, if so, what is doing the allowing?



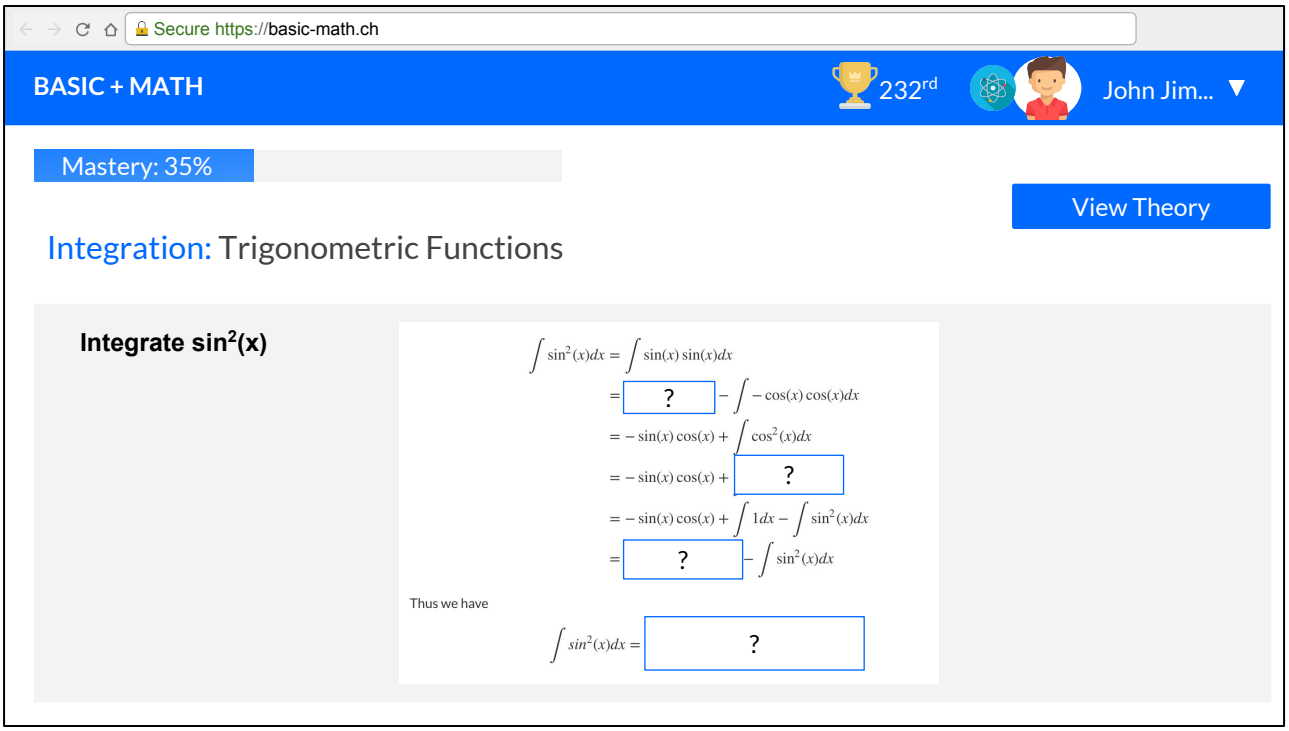

**Solution Field**: Smart algorithms detect whether the answer is correct. For example, it doesn't matter whether (x-3) (x+4) or (x+4) (x-3) is entered in the above example.



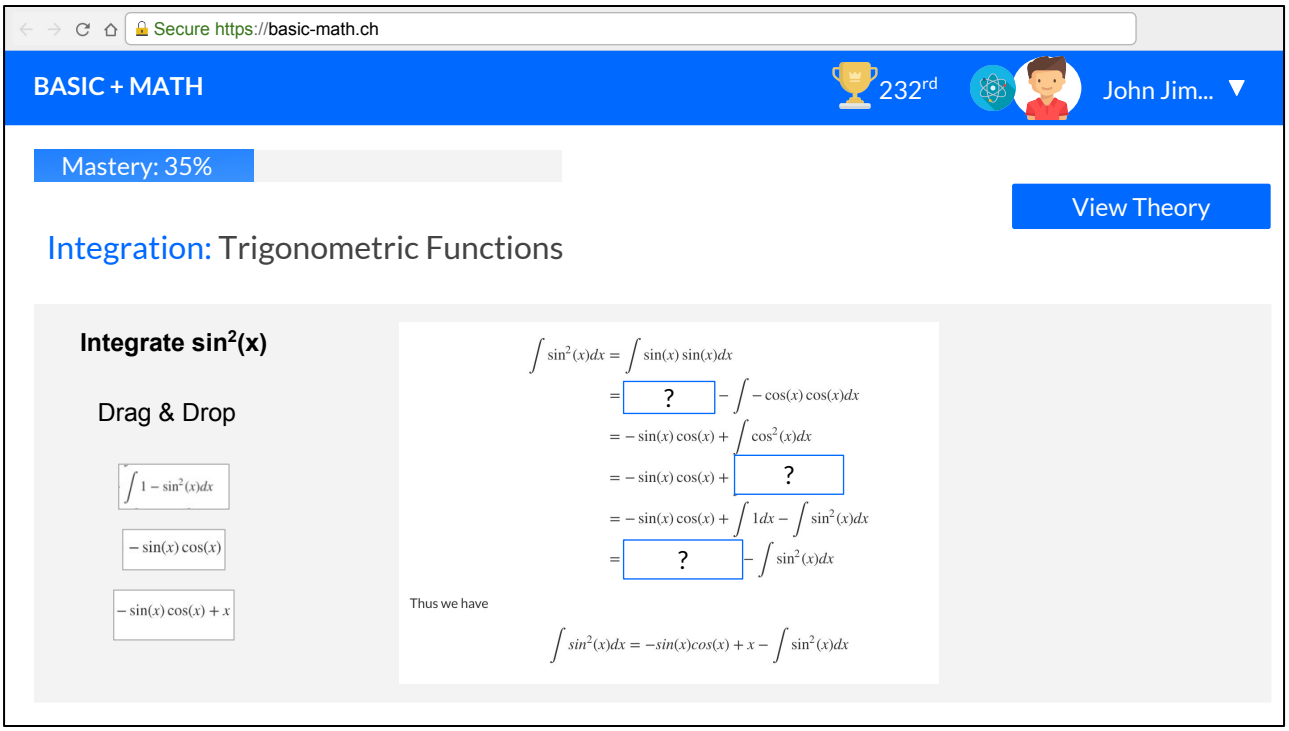

**Single Choice**: Only a single answer out of a set is correct.



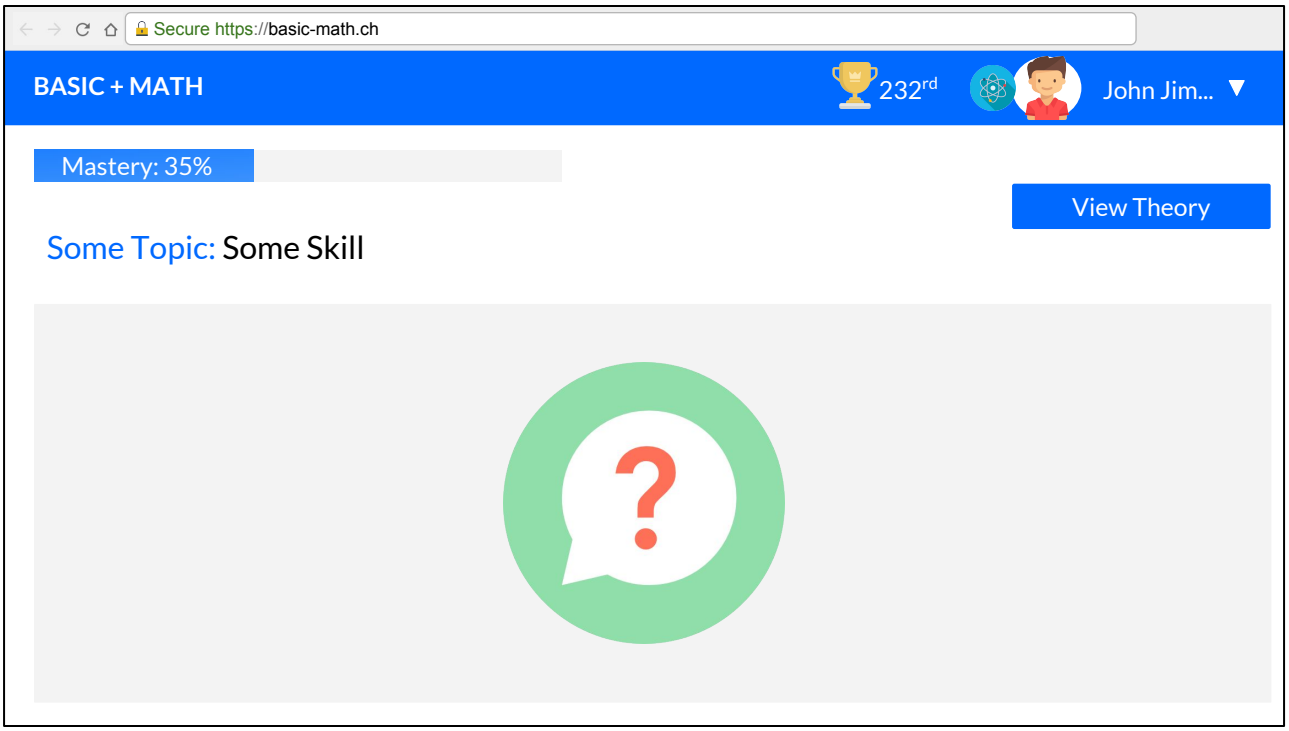

**True / False Questions**: They allow the user to leave something blank that he's not sure about, thus allowing for fair grading.




**Solution with gaps**: In order to gradually increase difficulty, part of the solution can be provided, so the user just has to fill in the gaps. This is also a nice user experience, since it's easy to just fill in gaps on mobile devices.



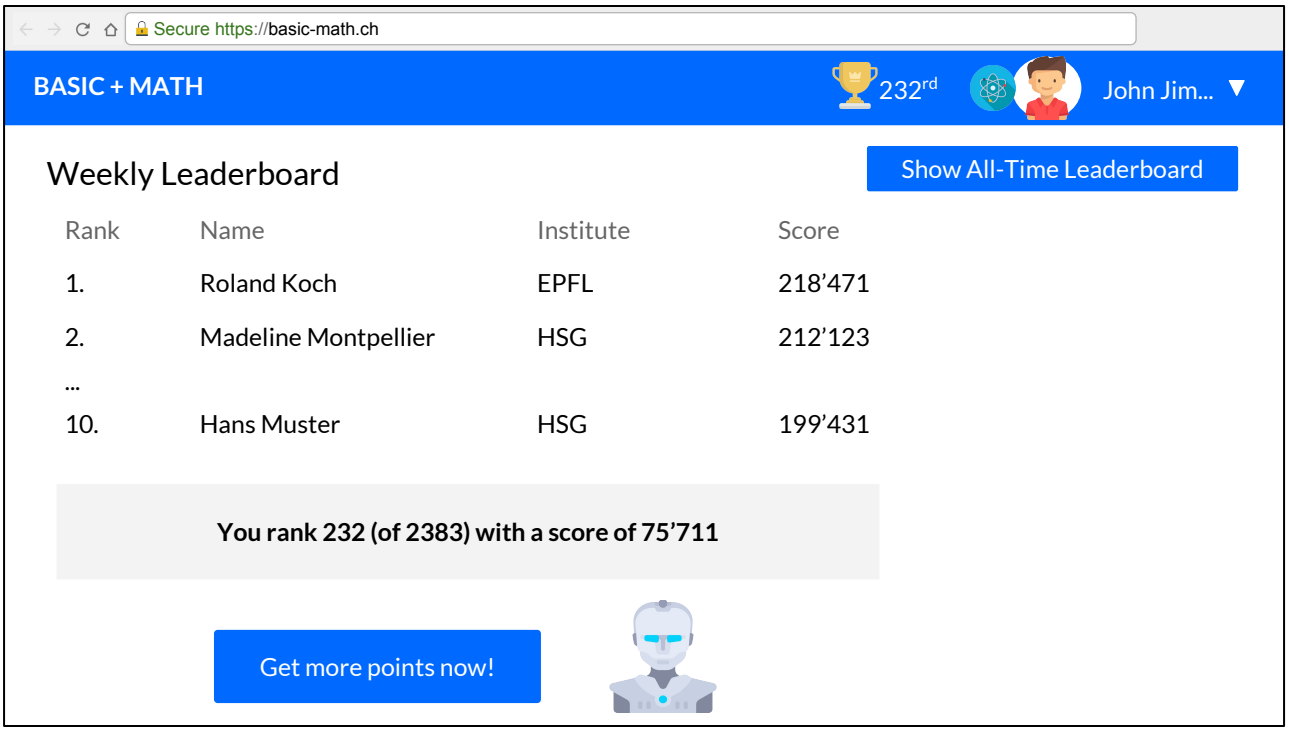

**Drag & Drop:** Playful possibility, especially well suited for mobile devices.




Which types will be implemented exactly is subject to discussion.

# Gamification

Engaging students more.




The leaderboard spurs engagement through competition / gamification. A leaderboard can be displayed for different time periods. An exact point system still needs to be determined. For example, should wrong answers be penalized with negative points, since otherwise students are tempted to just click through as much as possible?