Break-Ground:

What's the graph look like?

Two young mathematicians discuss how to sketch the graphs of functions.

Check out this dialogue between two calculus students (based on a true story):

Devyn: Riley, I've been thinking about the derivative.

Riley: It's all about change. It's some "change-detector" tool for math.

Devyn: I know! What's crazy is that you can use it as a tool for sniffing out dirt on functions.

Riley: First f' tells us increasing or decreasing.

Devyn: Then f'' tells us concavity.

**Riley:** From just that we know all local maxes and mins.

Devyn: And if we use limits, we can find any asymptotes!

Riley: You know, I'd like to make up a procedure based on all these facts, that would tell me what the graph of any function would look like.
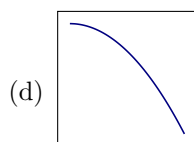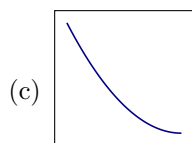
Devyn: Me too! Let's get to work!

Problem 1 *On some interval, we know that $f'(x)$ is positive and $f''(x)$ is positive. Which of the following is the best option for the shape of the graph on that interval?*

Multiple Choice:

(a) ✓

(b)
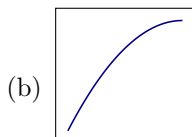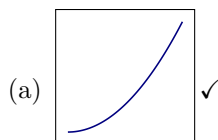
Learning outcomes: Determine how the graph of a function looks without using a calculator.

(c)

(d)

Problem 2 *On some interval, we know that $f'(x)$ is negative and $f''(x)$ is positive. Which of the following is the best option for the shape of the graph on that interval?*

Multiple Choice:

(a)

(b)

(c) ✓

(d)