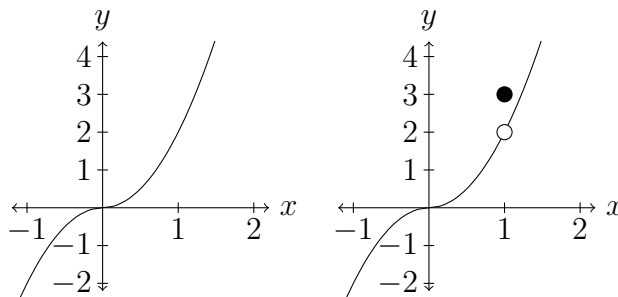


Section 2.2: The Limit of a Function

(1) What is the intuitive definition of a limit? Explain it in your own words.

(2) For the function graphed on the left, what is $\lim_{x \rightarrow 1} f(x)$? What would happen if we changed $f(1) = 3$ but kept everything else the same? Does the limit change? (See graph on right).



(3) Explain how you can use a calculator to approximate a limit. Why do you need to be careful?

- (4) Sometimes, different things can happen to a function on either side of an x -value. We can explain this behavior in (mathematical) words using one sided limits. What does $\lim_{x \rightarrow a^+}$ and $\lim_{x \rightarrow a^-}$ mean? Practice drawing functions that satisfy different one sided limit values and function values.
- (5) A limit can only exist at a point if the two one sided limits exist at that point. Another way to write this is:
- (6) What does it mean for a limit to equal ∞ or $-\infty$?
- (7) There are 6 different things that could happen that give us a vertical asymptote. What are they?
- (8) Draw the graph of a function with $f(2) = 3$, $\lim_{x \rightarrow 2^+} f(x) = 4$ and that has a vertical asymptote at $x = 2$.

Important ideas to know from this section:

- Limits don't care about the value of the function at the specific x value. They care about what happens on either side of that x -value.