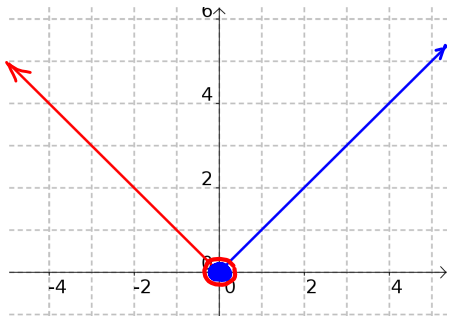
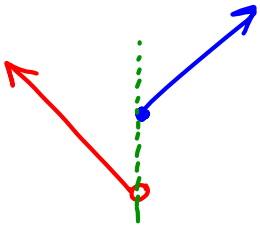
## Piecewise Functions

Some functions are represented by two or more pieces.
For example, the absolute value function:

$$f(x) = \begin{cases} x, & x \geq 0 \\ -x, & x < 0 \end{cases}$$




Notice that intervals are
mutually exclusive
(i.e., they don't overlap).



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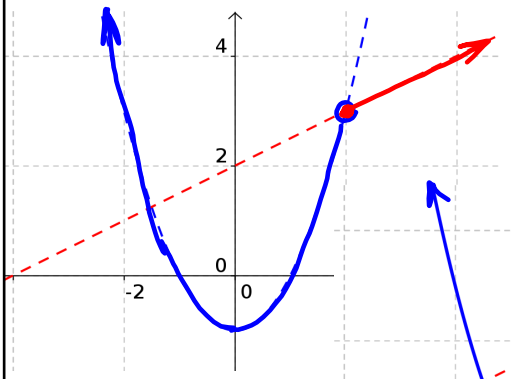
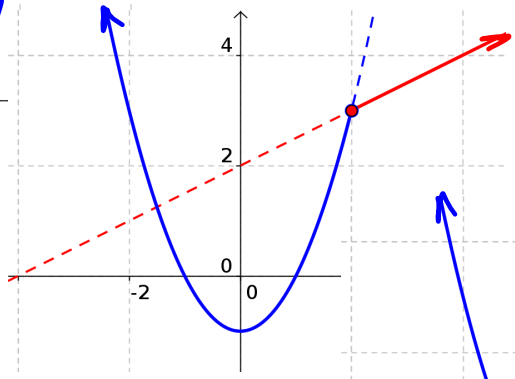
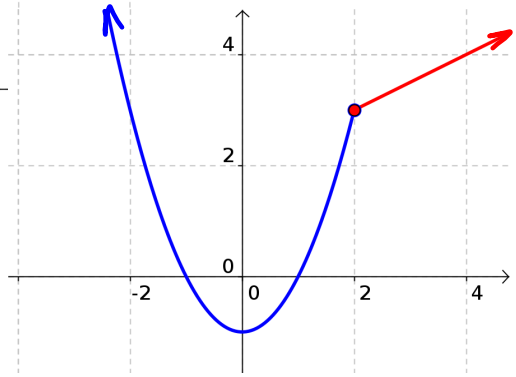
To represent a piecewise function, you may wish to fully sketch or graph each piece (dotted lines), and then emphasize or remove sections according to the intervals for each piece.

$$f(x) = \begin{cases} x^2 - 1 & x < 2 \\ \frac{1}{2}x + 2 & x \geq 2 \end{cases}$$

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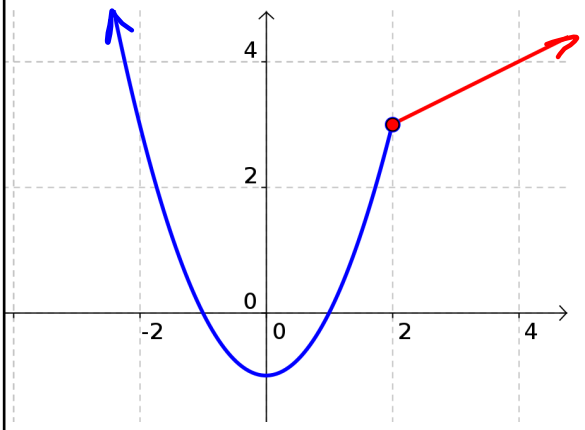
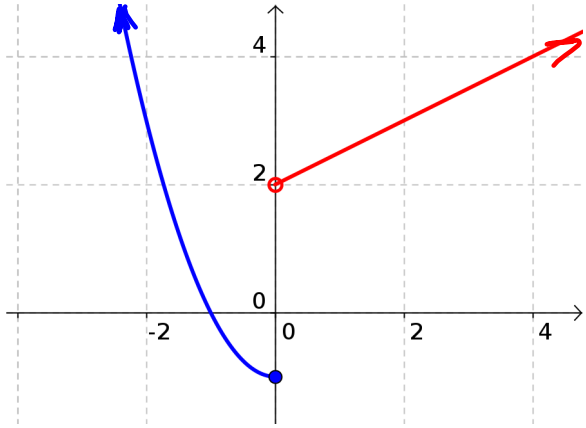
The intervals for each piece can have a significant impact on the overall function, including continuity or any discontinuities.




$$f(x) = \begin{cases} x^2 - 1 & x < 2 \\ \frac{1}{2}x + 2 & x \geq 2 \end{cases}$$

continuous function

$$f(x) = \begin{cases} x^2 - 1, & x \leq 0 \\ \frac{1}{2}x + 2, & x > 0 \end{cases}$$

discontinuity at x = 0

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Assigned Work:

p.51 # 3, 4, 5cd, 6, 8, 9, 11, 13

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