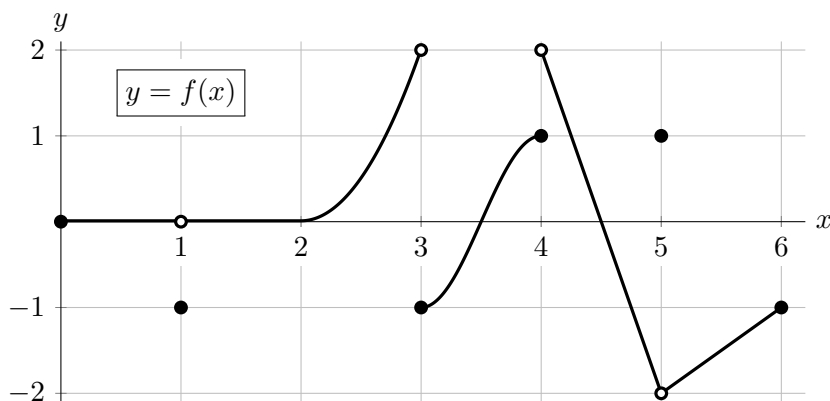


7. [12 points] The graph of the function $f(x)$ is shown below.



For **a.–c.**, give your answers as a list of one or more of the given numbers, or write NONE.

- a. [1 point] At which of the values $a = 1, 2, 3, 4, 5$ is $f(a)$ undefined?
b. [1 point] For which of the values $a = 1, 2, 3, 4, 5$ is $f(x)$ continuous at $x = a$?
c. [2 points] For which of the values $a = 1, 2, 3, 4, 5$ is $f(a) = \lim_{x \rightarrow a^-} f(x)$?

For **d.–g.**, use the graph of the function $f(x)$ to evaluate each of the expressions below. If a limit diverges to ∞ or $-\infty$ or if the limit does not exist for any other reason, write DNE.

- d. [2 points] $\lim_{x \rightarrow 5} f(x)$
e. [2 points] $\lim_{x \rightarrow 3} f(x)$
f. [2 points] $\lim_{x \rightarrow 0} f(4 + |x|)$
g. [2 points] $\lim_{h \rightarrow 0} \frac{f(4.25 + h) - f(4.25)}{h}$
8. [11 points] Consider the rational function $g(x) = \frac{(x - 12)(x - 7)(x - 2)}{(2x - 4)(x - 3)(x - 5)}$.

- a. [2 points] What are the vertical asymptotes of the function $g(x)$?
b. [2 points] What are the vertical asymptotes of the function $\frac{1}{g(x)}$?

The piecewise function $h(x)$ is defined as follows, where $g(x)$ is as above, where $f(x)$ is from Problem 7 above, and where B is a nonzero constant.

$$h(x) = \begin{cases} \frac{e^{2x}}{x^2} & x \leq 3 \\ B \cdot f(x) & 3 < x \leq 6 \\ g(x) & 6 < x \end{cases}$$

- c. [3 points] Find an *exact* value of B for which the function $h(x)$ is continuous at $x = 3$. Show your work.

Evaluate each of the expressions below. If a limit diverges to ∞ or $-\infty$ or if the limit does not exist for any other reason, write DNE.

- d. [2 points] $\lim_{x \rightarrow \infty} h(x)$
e. [2 points] $\lim_{x \rightarrow -\infty} h(x)$