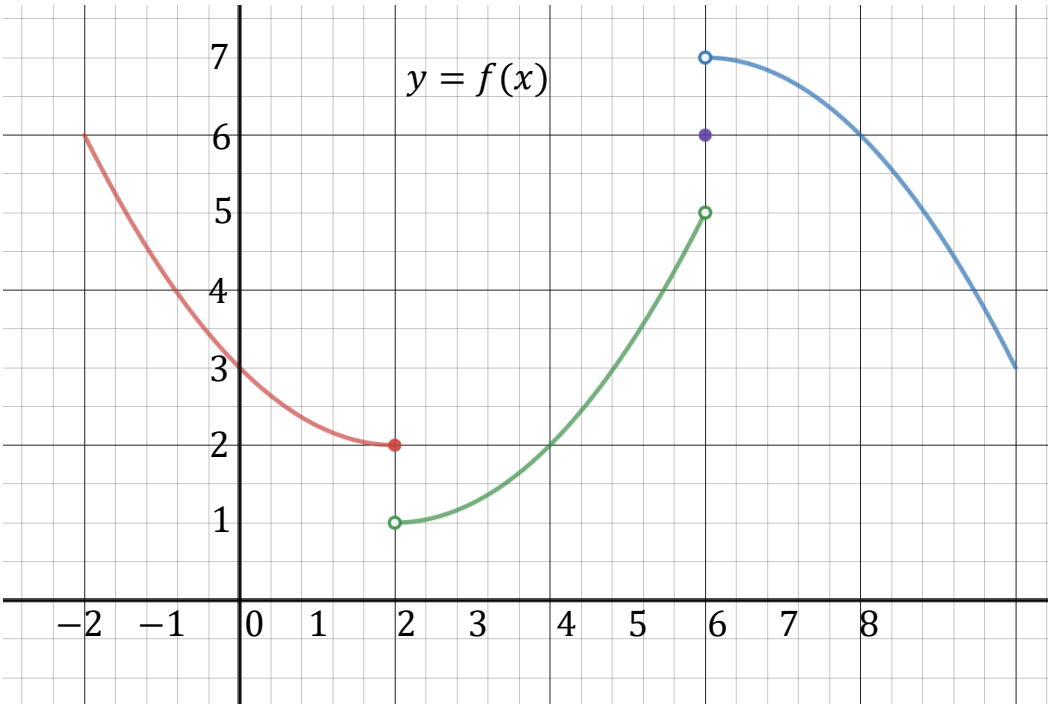
Limits and One-sided Limits- HW Problems

1. Using the graph below find the values of the following expressions. If the limit doesn't exist explain why.



$a.\ \lim_{x\to 2^-} f(x)$ $b.\ \lim_{x\to 2^+} f(x)$ $c.\ \lim_{x\to 2} f(x)$ $d.\ f(2)$

$e.\ \lim_{x\to 6^-} f(x)$ $f.\ \lim_{x\to 6^+} f(x)$ $g.\ \lim_{x\to 6} f(x)$ $h.\ f(6)$

2. Find $\lim_{x\to 3} \frac{x^2-2x-3}{x-3}$ by evaluating the function at
$x = 4,\ 3.1,\ 3.01,\ 3.001,\ 2,\ 2.9,\ 2.99,\ 2.999.$

3. Find $\lim_{x\to -2} \frac{x^2-x-6}{x^2+3x+2}$ by evaluating the function at
$x = -1, -1.9, -1.99, -1.999, -3, -2.1, -2.01, -2.001.$

4. Sketch a graph of:

$$f(x) = -x^2 + 2 \quad if\ x \geq 1$$
$$= x + 3 \quad if\ x < 1.$$

Find the following quantities. If a limit does not exist explain why.

$a.$ $\lim_{x \to 1^+} f(x)$

$b.$ $\lim_{x \to 1^-} f(x)$

$c.$ $\lim_{x \to 1} f(x)$

$d.$ $f(1)$