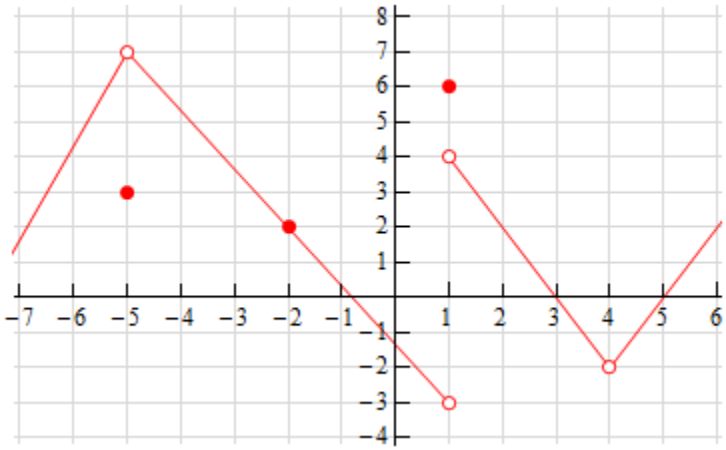
Section 2-3 : One–Sided Limits

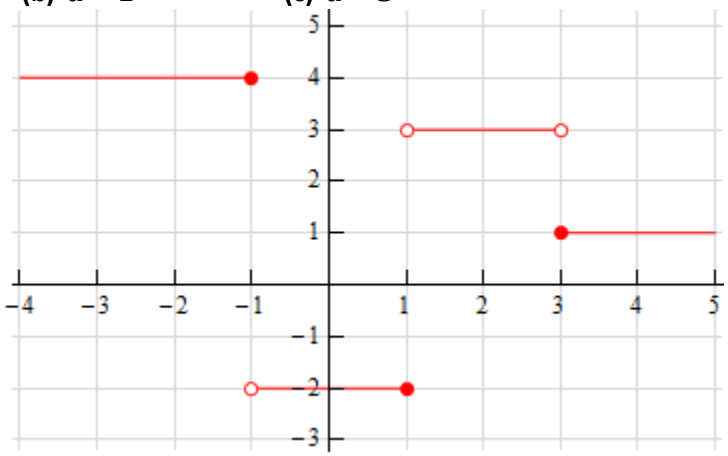
1. Below is the graph of $f(x)$. For each of the given points determine the value of $f(a)$, $\lim_{x\to a^-} f(x)$, $\lim_{x\to a^+} f(x)$, and $\lim_{x\to a} f(x)$. If any of the quantities do not exist clearly explain why.

(a) $a=-5$ **(b)** $a=-2$ **(c)** $a=1$ **(d)** $a=4$



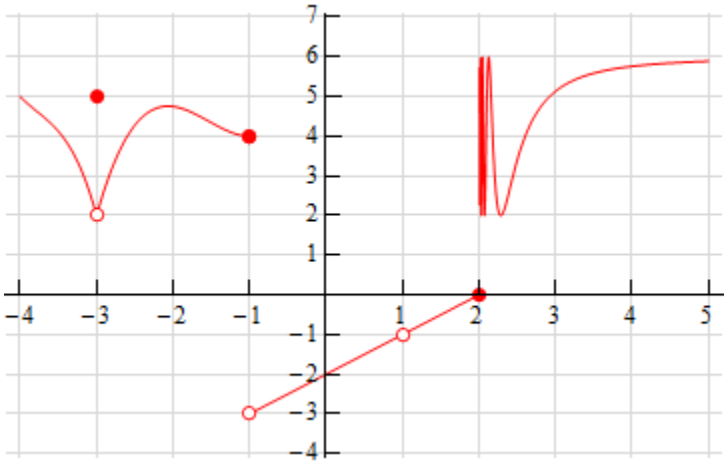
2. Below is the graph of $f(x)$. For each of the given points determine the value of $f(a)$, $\lim_{x\to a^-} f(x)$, $\lim_{x\to a^+} f(x)$, and $\lim_{x\to a} f(x)$. If any of the quantities do not exist clearly explain why.

(a) $a=-1$ **(b)** $a=1$ **(c)** $a=3$



3. Below is the graph of $f(x)$. For each of the given points determine the value of $f(a)$, $\lim_{x\to a^-} f(x)$, $\lim_{x\to a^+} f(x)$, and $\lim_{x\to a} f(x)$. If any of the quantities do not exist clearly explain why.

(a) $a=-3$ **(b)** $a=-1$ **(c)** $a=1$ **(d)** $a=2$



4. Sketch a graph of a function that satisfies each of the following conditions.

$\lim_{x\to 1^-} f(x)=-2$ $\lim_{x\to 1^+} f(x)=3$ $f(1)=6$

5. Sketch a graph of a function that satisfies each of the following conditions.

$\lim_{x\to -3^-} f(x)=1$ $\lim_{x\to -3^+} f(x)=1$ $f(-3)=4$

6. Sketch a graph of a function that satisfies each of the following conditions.

$\lim_{x\to -5^-} f(x)=-1$ $\lim_{x\to -5^+} f(x)=7$ $f(-5)=4$

$\lim_{x\to 4} f(x)=6$ $f(4)$ does not exist

7. Explain in your own words what each of the following equations mean.

$\lim_{x\to 8^-} f(x)=3$ $\lim_{x\to 8^+} f(x)=-1$

8. Suppose we know that $\lim_{x\to -7} f(x)=18$. If possible, determine the value of $\lim_{x\to -7^-} f(x)$ and the value of $\lim_{x\to -7^+} f(x)$. If it is not possible to determine one or both of these values explain why not.

9. Suppose we know that $f(6)=-53$. If possible, determine the value of $\lim_{x\to 6^-} f(x)$ and the value of $\lim_{x\to 6^+} f(x)$. If it is not possible to determine one or both of these values explain why not.