MATH 0120 Business Calculus. Suggested Exercises Section 2.1 (continued)

University of Pittsburgh, Summer 6W2 2019

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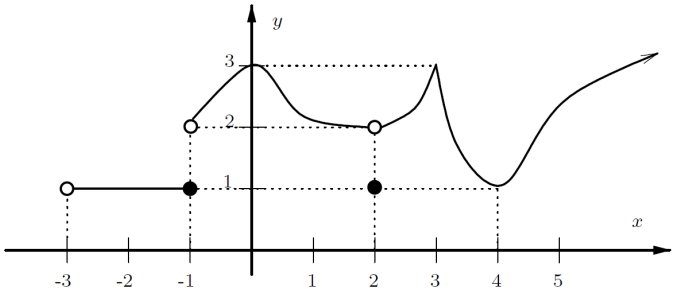
1. For the function $f(x)$ whose graph is given, state the value of each quantity, if it exists. If it does not exist, write DNE.

1.



(a) $\lim_{x \to -3^+} f(x)$

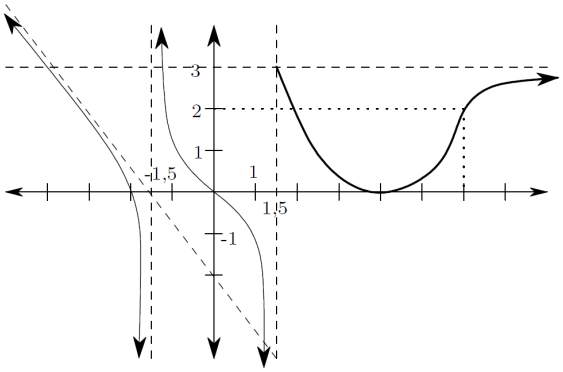
(b) $\lim_{x \to -1} f(x)$

(c) $\lim_{x \to 2} f(x)$

(d) $f(-1)$; $f(2)$

(e) $\lim_{x \to +\infty} f(x)$

2.



(a) $\lim_{x \to -\infty} f(x)$

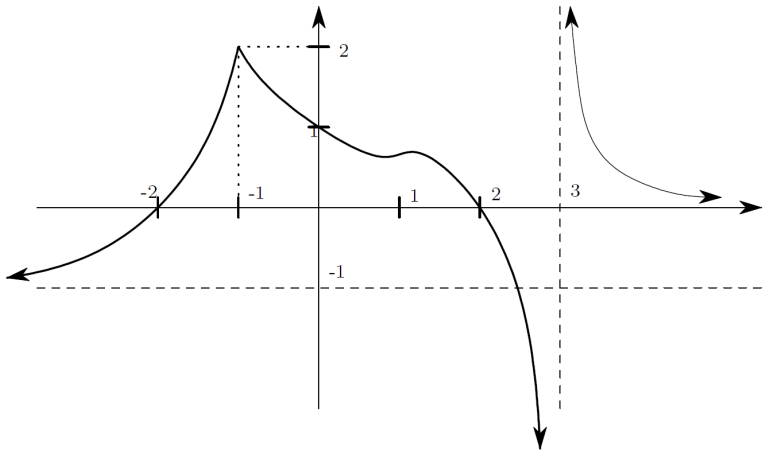
(b) $\lim_{x \to -3/2} f(x)$

(c) $\lim_{x \to 3/2} f(x)$

(d) $f(3/2)$

(e) $\lim_{x \to +\infty} f(x)$

3.



(a) $\lim_{x \to -\infty} f(x)$

(b) $\lim_{x \to -2} f(x)$

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

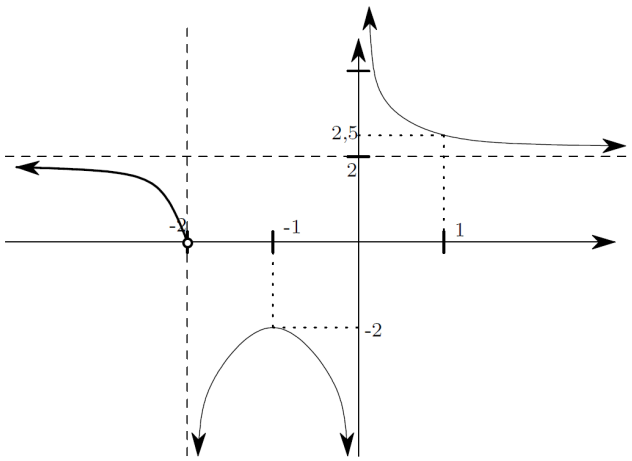
(d) $\lim_{x \to 0} f(x)$

(e) $\lim_{x \to 2} f(x)$

(f) $\lim_{x \to 3} f(x)$

(g) $\lim_{x \to +\infty} f(x)$

4.



(a) $\lim_{x\to-\infty} f(x)$

(b) $\lim_{x\to-2} f(x)$

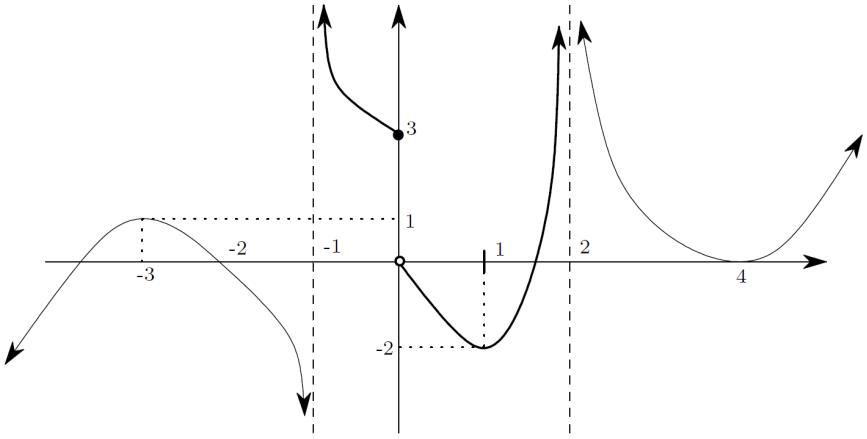
(c) $\lim_{x\to-1} f(x)$

(d) $\lim_{x\to0} f(x)$

(e) $\lim_{x\to1} f(x)$

(f) $\lim_{x\to+\infty} f(x)$

5.



(a) $\lim_{x\to-\infty} g(x)$

(b) $\lim_{x\to-3} g(x)$

(c) $\lim_{x\to-1} g(x)$

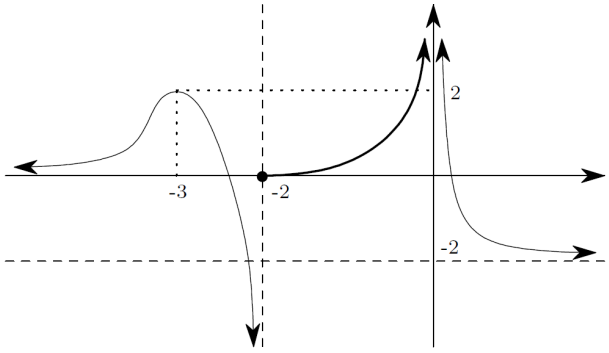
(d) $\lim_{x\to0} g(x)$

(e) $\lim_{x\to1} g(x)$

(f) $\lim_{x\to2} g(x)$

(g) $\lim_{x\to+\infty} g(x)$

6.



(a) $\lim_{x\to-\infty} h(x)$

(b) $\lim_{x\to-3} h(x)$

(c) $\lim_{x\to-2} h(x)$

(d) $\lim_{x\to0} h(x)$

(e) $\lim_{x\to+\infty} h(x)$

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2. Evaluate the following llimits

   (a) $\lim\limits_{x\to 2} \dfrac{x^3+x^2-6x}{x^3-3x^2+4}$

   (b) $\lim\limits_{y\to 2} \dfrac{|\, y+3\,|-|\,2y+1\,|}{y^2-4}$

   (c) $\lim\limits_{z\to -4} \dfrac{|\,3z+1\,|-z^2+5}{2z-1+|\,5-z\,|}$

   (d) $\lim\limits_{x\to 3} \dfrac{9-6x+x^2}{\sqrt{18-3x}-3}$

   (e) $\lim\limits_{x\to \infty} \dfrac{2x^2-3x-4}{\sqrt{x^4+1}}$

   (f) $\lim\limits_{x\to -\infty} \dfrac{x^2-3}{3\sqrt[3]{x^3+1}}$

   (g) $\lim\limits_{x\to -\infty} \sqrt{4x^2-6}-\sqrt{4x^2-x}$

   (h) $\lim\limits_{x\to -\infty} x(\sqrt{x^2+1}-x)$

3. Sketch the graph of an example of a function f that satisfies all of the given conditions:

   $\lim\limits_{x\to 0} f(x)=1,\ \lim\limits_{x\to 3^-} f(x)=-2,\ \lim\limits_{x\to 3^+} f(x)=2,\ f(0)=-1,$

   $\lim\limits_{x\to -\infty} f(x)=+\infty,\ \lim\limits_{x\to \infty} f(x)=5,$ and $f(3)=1$

4. Let $g(x)=\begin{cases} -x & x<1 \\ 10 & x=1 \\ x^2+1 & x>1 \end{cases}$

   Find the following limits if they exist, or justify why do not exist.

   (a) $\lim\limits_{x\to 2} g(x)$

   (b) $\lim\limits_{x\to 1} g(x)$

5. Is the following function continuous at $a=-2$? Explain.

   $g(x)=\begin{cases} \dfrac{1}{x+2} & x\neq -2 \\ 1 & x=-2 \end{cases}$

6. For what values of the constant b is $g(x)=\begin{cases} \dfrac{x-b}{b+1} & x\leq 0 \\ x^2+b & x>0 \end{cases}$

   continuous at every x?