Limits from Graphs and Tables

1. Answer questions about function values and limits based on the graphs below.

**(A)** $f(-2) =$
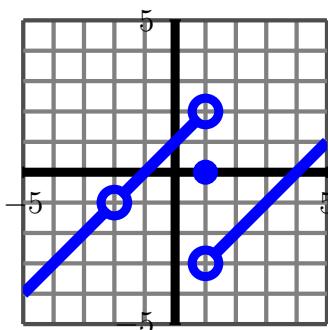
(B) $\lim\limits_{x \to -2} f(x) =$

(C) $f(1) =$

(D) $\lim\limits_{x \to 1} f(x) =$

(E) $f(3) =$

(F) $\lim\limits_{x \to 3} f(x) =$

(A) $f(-2) =$
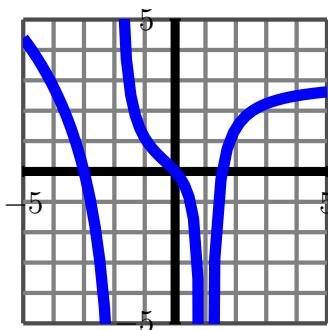
(B) $\lim\limits_{x \to -2} f(x) =$

(C) $f(1) =$

(D) $\lim\limits_{x \to 1} f(x) =$

(E) $\lim\limits_{x \to 1^+} f(x) =$

(F) $\lim\limits_{x \to 1^-} f(x) =$

(A) $f(-2) =$
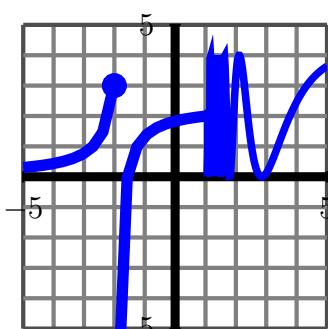
(B) $\lim\limits_{x \to -2} f(x) =$

(C) $f(1) =$

(D) $\lim\limits_{x \to 1} f(x) =$

(E) $\lim\limits_{x \to -2^-} f(x) =$

(F) $\lim\limits_{x \to -2^+} f(x) =$

(A) $\lim\limits_{x \to 1} f(x) =$

(B) $\lim\limits_{x \to -2} f(x) =$
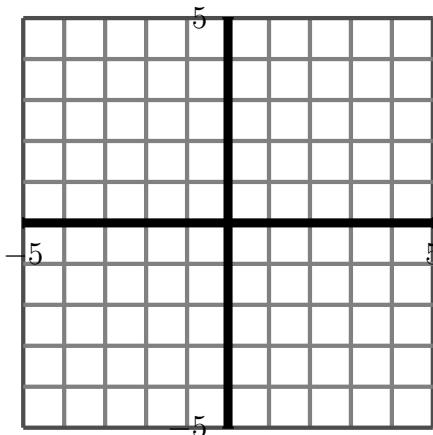
(C) $\lim\limits_{x \to 1^-} f(x) =$

(D) $\lim\limits_{x \to -2^-} f(x) =$

(E) $\lim\limits_{x \to 1^+} f(x) =$

(F) $\lim\limits_{x \to -2^+} f(x) =$

2. Sketch a graph which satisfies the limit statements below.

- $\lim\limits_{x \to -\infty} f(x) = 2$

- $\lim\limits_{x \to -3^-} f(x) = \infty$

- $\lim\limits_{x \to -3^+} f(x) = -\infty$

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

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

- $\lim\limits_{x \to 2} f(x) = \infty$

- $\lim\limits_{x \to 4} f(x) = -3$

- $f(4) = 3$

3. The table below gives values of $f(x) = \frac{\sin(x)}{x}$.

What conclusions can you draw about $\lim\limits_{x \to 0} \frac{\sin(x)}{x}$?

x	-0.5	-0.4	-0.3	-0.2	-0.1	**0**	0.1	0.2	0.3	0.4	0.5
$\frac{\sin x}{x}$	0.959	0.974	0.985	0.993	0.998	**DNE**	0.998	0.993	0.985	0.974	0.959

4. The table below gives values of the topologist's sine curve $f(x) = \sin(1/x)$.

What conclusions can you draw about $\lim\limits_{x \to 0} \sin(1/x)$?

x	$\frac{-2}{96\pi}$	$\frac{-2}{97\pi}$	$\frac{-2}{98\pi}$	$\frac{-2}{99\pi}$	$\frac{-2}{100\pi}$	$\frac{-2}{101\pi}$	**0**	$\frac{2}{101\pi}$	$\frac{2}{100\pi}$	$\frac{2}{99\pi}$	$\frac{2}{98\pi}$	$\frac{2}{97\pi}$	$\frac{2}{96\pi}$
$\sin(1/x)$	0	1	0	-1	0	1	**DNE**	1	0	-1	0	1	0

5. The table below gives values of $f(x) = \frac{1 - \cos(x)}{x}$.

What conclusions can you draw about $\lim\limits_{x \to 0} \frac{1 - \cos(x)}{x}$?

x	-0.2	-0.15	-0.1	-0.05	-0.01	**0**	0.01	0.05	0.1	0.15	0.2
$\frac{\sin x}{x}$	-0.100	-0.075	-0.050	-0.025	-0.005	**DNE**	0.005	0.025	0.050	0.075	0.100