

1. For each of the following function, first complete the table and then, based on the table, find the given limits. If a limit does not exist, write "DNE".

(a)  $f(x) = \frac{x^2 - x - 6}{x - 3}$

$x$	2.9	2.99	2.999	2.9999	3.1	3.01	3.001	3.0001
$f(x)$								

$\lim_{x \rightarrow 3^-} f(x) =$

$\lim_{x \rightarrow 3^+} f(x) =$

$\lim_{x \rightarrow 3} f(x) =$

(b)  $f(x) = \frac{|x - 3|}{x - 3}$

$x$	2.9	2.99	2.999	2.9999	3.1	3.01	3.001	3.0001
$f(x)$								

$\lim_{x \rightarrow 3^-} f(x) =$

$\lim_{x \rightarrow 3^+} f(x) =$

$\lim_{x \rightarrow 3} f(x) =$

(c)  $f(x) = \frac{1 - \cos x}{x^2}$

$x$	-0.1	-0.01	-0.001	-0.0001	0.1	0.01	0.001	0.0001
$f(x)$								

$\lim_{x \rightarrow 0^-} f(x) =$

$\lim_{x \rightarrow 0^+} f(x) =$

$\lim_{x \rightarrow 0} f(x) =$

(d)  $f(x) = (1 + x)^{\frac{1}{x}}$

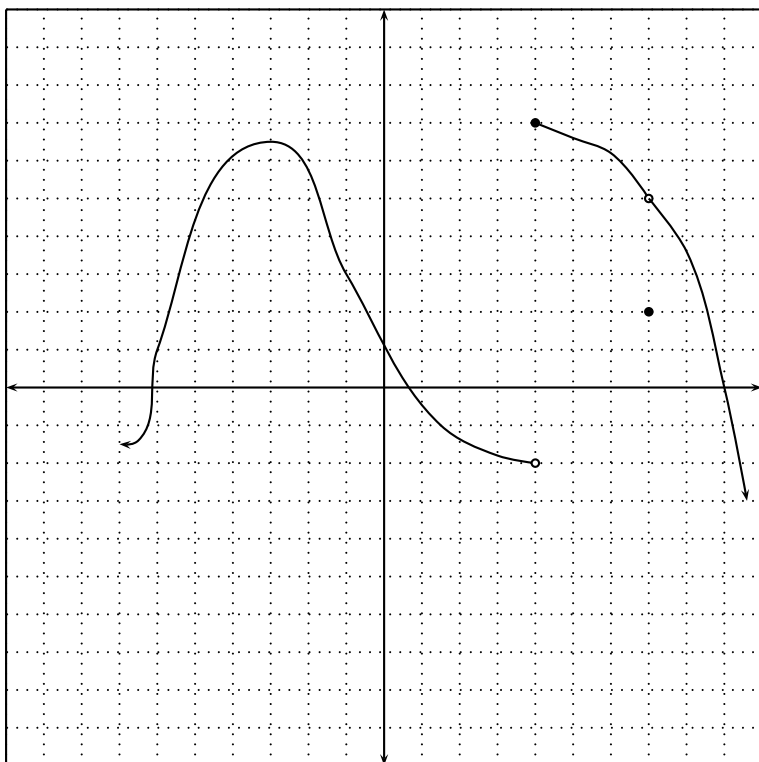
$x$	-0.01	-0.0001	-0.000001	-0.00000001	0.01	0.0001	0.000001	0.00000001
$f(x)$								

$\lim_{x \rightarrow 0^-} f(x) =$

$\lim_{x \rightarrow 0^+} f(x) =$

$\lim_{x \rightarrow 0} f(x) =$

2. Use the following graph to find each of the following. If a limit does not exist, write "DNE".



(a)  $f(-1)$

(c)  $\lim_{x \rightarrow 4^+} f(x)$

(e)  $f(7)$

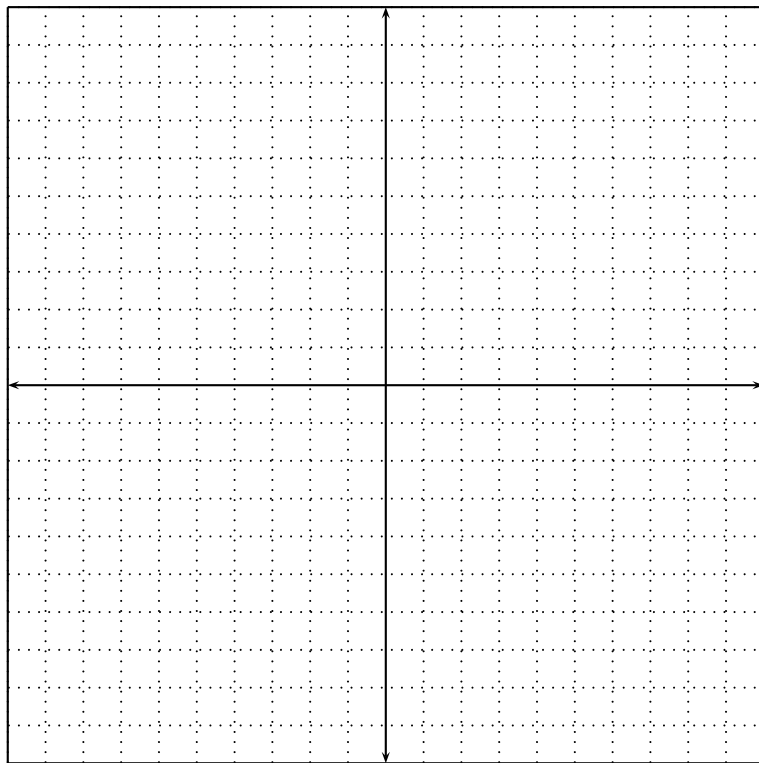
(b)  $\lim_{x \rightarrow 4^-} f(x)$

(d)  $\lim_{x \rightarrow 4} f(x)$

(f)  $\lim_{x \rightarrow 7} f(x)$

3. Let  $f$  be the function defined by  $f(x) = \begin{cases} -x + 3 & \text{if } x < 2 \\ 3 & \text{if } x = 2 \\ -x^2 + 6x - 3 & \text{if } x > 2 \end{cases}$

(a) Sketch the graph of  $f$ .



(b) For each of the following, find the limit if it exists. If the limit does not exist, write "DNE".

$$\lim_{x \rightarrow 2^-} f(x)$$

$$\lim_{x \rightarrow 2^+} f(x)$$

$$\lim_{x \rightarrow 2} f(x)$$

4. Prove:  $\lim_{x \rightarrow 7} (5x - 3) = 32$