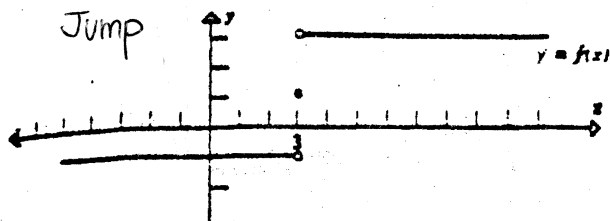


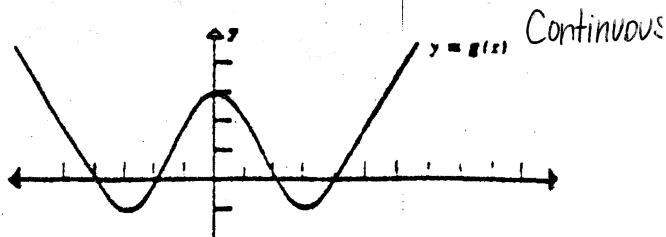
# TO $\infty$ AND BEYOND!

For each of the following, write the test of continuity which it fails. In the unlikely event the function is continuous, write "continuous."

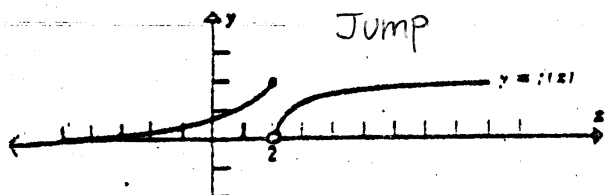
$\lim_{x \rightarrow 3^-} f(x) = -1$	$\lim_{x \rightarrow 3^+} f(x) = 3$
$\lim_{x \rightarrow 3} f(x) = \text{DNE}$	$f(3) = 1$
$\lim_{x \rightarrow -\infty} f(x) = -1$	$\lim_{x \rightarrow \infty} f(x) = 3$



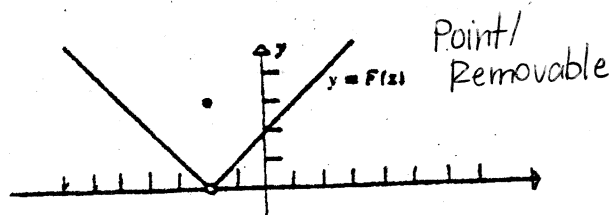
$\lim_{x \rightarrow 0^-} f(x) = 3$	$\lim_{x \rightarrow 0^+} f(x) = 3$
$\lim_{x \rightarrow 0} f(x) = 3$	$f(0) = 3$
$\lim_{x \rightarrow -\infty} f(x) = \infty$	$\lim_{x \rightarrow \infty} f(x) = \infty$



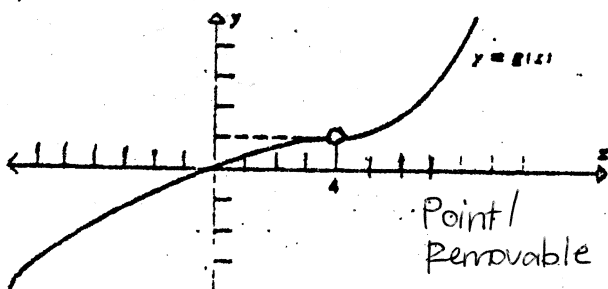
$\lim_{x \rightarrow 2^-} f(x) = 2$	$\lim_{x \rightarrow 2^+} f(x) = 0$
$\lim_{x \rightarrow 2} f(x) = \text{DNE}$	$f(2) = 2$
$\lim_{x \rightarrow -\infty} f(x) = 0$	$\lim_{x \rightarrow \infty} f(x) = 2$



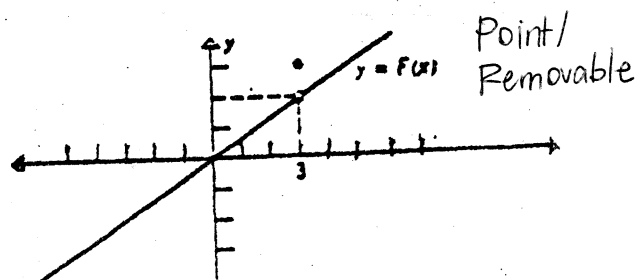
$\lim_{x \rightarrow -2^-} f(x) = 0$	$\lim_{x \rightarrow -2^+} f(x) = 0$
$\lim_{x \rightarrow -2} f(x) = 0$	$f(-2) = 3$
$\lim_{x \rightarrow -\infty} f(x) = \infty$	$\lim_{x \rightarrow \infty} f(x) = \infty$



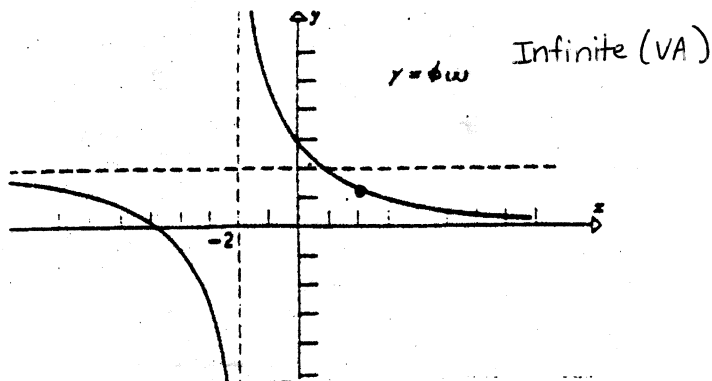
$\lim_{x \rightarrow 4^-} f(x) = 1$	$\lim_{x \rightarrow 4^+} f(x) = 1$
$\lim_{x \rightarrow 4} f(x) = 1$	$f(4) = \text{DNE}$
$\lim_{x \rightarrow -\infty} f(x) = -\infty$	$\lim_{x \rightarrow \infty} f(x) = \infty$



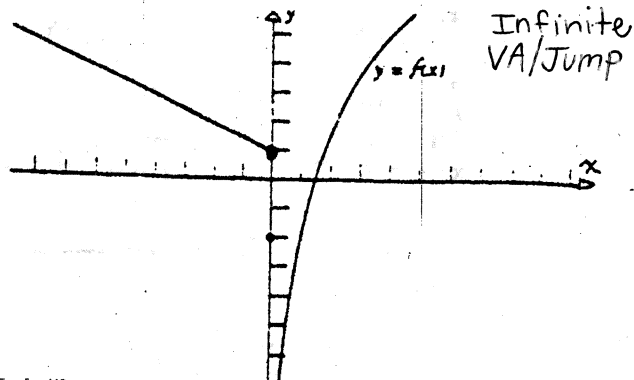
$\lim_{x \rightarrow 3^-} f(x) = 2$	$\lim_{x \rightarrow 3^+} f(x) = 2$
$\lim_{x \rightarrow 3} f(x) = 2$	$f(3) = 3$
$\lim_{x \rightarrow -\infty} f(x) = -\infty$	$\lim_{x \rightarrow \infty} f(x) = \infty$



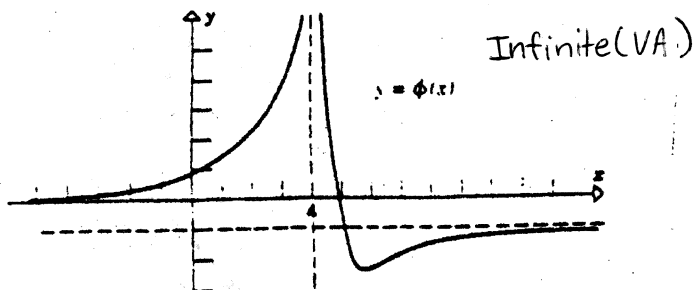
$$\begin{aligned} \lim_{x \rightarrow 2^-} f(x) &= 1 & \lim_{x \rightarrow 2^+} f(x) &= 1 \\ \lim_{x \rightarrow 2} f(x) &= 1 & f(2) &= 1 \\ \lim_{x \rightarrow \infty} f(x) &= 2 & \lim_{x \rightarrow \infty} f(x) &= 0 \end{aligned}$$



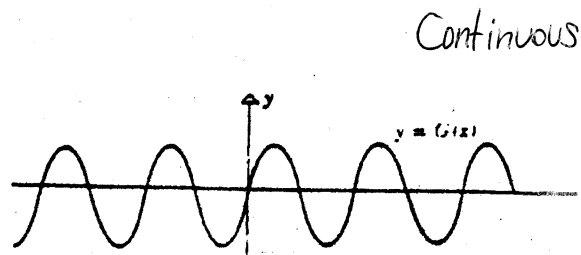
$$\begin{aligned} \lim_{x \rightarrow 0^-} f(x) &= 1 & \lim_{x \rightarrow 0^+} f(x) &= -\infty \\ \lim_{x \rightarrow 0} f(x) &= \text{DNE} & f(0) &= 1 \\ \lim_{x \rightarrow \infty} f(x) &= \infty & \lim_{x \rightarrow \infty} f(x) &= \infty \end{aligned}$$



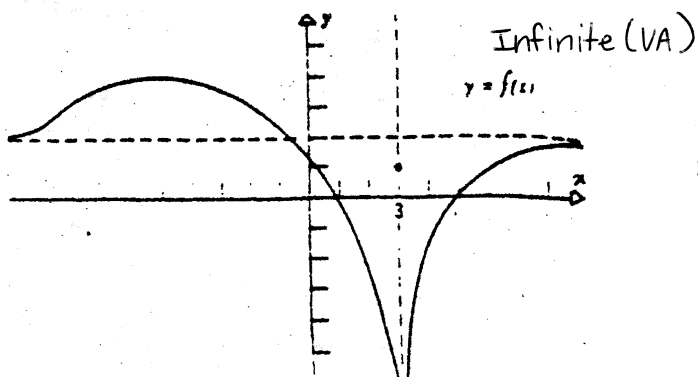
$$\begin{aligned} \lim_{x \rightarrow 4^-} f(x) &= \infty & \lim_{x \rightarrow 4^+} f(x) &= \infty \\ \lim_{x \rightarrow 4} f(x) &= \infty & f(4) &= \text{DNE} \\ \lim_{x \rightarrow \infty} f(x) &= 0 & \lim_{x \rightarrow \infty} f(x) &= -1 \end{aligned}$$



$$\begin{aligned} \lim_{x \rightarrow 0^-} f(x) &= 0 & \lim_{x \rightarrow 0^+} f(x) &= 0 \\ \lim_{x \rightarrow 0} f(x) &= 0 & f(0) &= 0 \\ \lim_{x \rightarrow \infty} f(x) &= \text{DNE} & \lim_{x \rightarrow \infty} f(x) &= \text{DNE} \end{aligned}$$



$$\begin{aligned} \lim_{x \rightarrow 3^-} f(x) &= -\infty & \lim_{x \rightarrow 3^+} f(x) &= -\infty \\ \lim_{x \rightarrow 3} f(x) &= -\infty & f(3) &= 1 \\ \lim_{x \rightarrow \infty} f(x) &= 2 & \lim_{x \rightarrow \infty} f(x) &= 2 \end{aligned}$$



$$\begin{aligned} \lim_{x \rightarrow 0^-} f(x) &= 3 & \lim_{x \rightarrow 0^+} f(x) &= 3 \\ \lim_{x \rightarrow 0} f(x) &= 3 & f(0) &= 3 \\ \lim_{x \rightarrow \infty} f(x) &= \text{DNE} & \lim_{x \rightarrow \infty} f(x) &= 0 \end{aligned}$$

