What you'll Learn About

- One-Sided and Two Sided Limits
- Properties of Limits

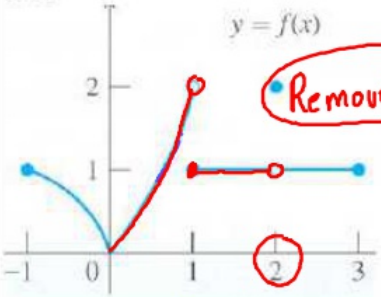
y-value

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

x approaches 1 from the left

y approaching 2

38.



Removeable

$\lim_{x \to 1} f(x) = DNE$

Both left and right of x = 1

a) $\lim_{x \to 1^-} f(x) = 2$ b) $\lim_{x \to 1^+} f(x) = 1$ c) $\lim_{x \to 1} f(x) =$ DNE d) f(1) = 1 (x = 1, y =)

e) $\lim_{x \to 0^+} f(x) = 0$ f) $\lim_{x \to 0^-} f(x) = 0$ g) $\lim_{x \to 0} f(x) = 0$ h) f(0) = 0

Definition of a continuity

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

True/False

l) $\lim_{x \to c} f(x)$ exists at every c between (-1,1) (TRUE) (Interval)

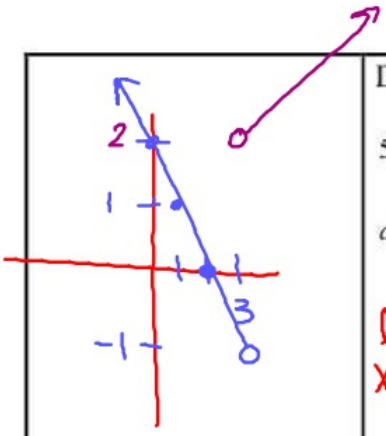
c any x between -1 and 1

m) $\lim_{x \to c} f(x)$ exists at every c between (1,3) TRUE

n) $\lim_{x \to c} f(x)$ exists at every c between (-1,3) False

No Limit — Jump

Limit — Hole



Determine the limits for the piecewise function given below

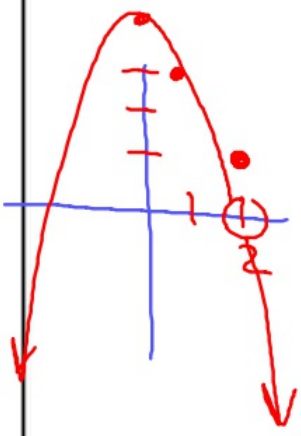
51A. $f(x)=\begin{cases} 2-x & x<3 \\ \frac{x}{3}+1 & x>3 \end{cases}$ Left Right

a) $\lim_{x\to 3^-} f(x)=$ b) $\lim_{x\to 3^+} f(x)=$ c) $\lim_{x\to 3} f(x)=$ DNE d) f(3)= DNE

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

b) $\lim_{x\to 3^+}\left(\frac{x}{3}+1\right)=2$

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



54A. $f(x)=\begin{cases} 4-x^2 & x\neq 2 \\ 1 & x=2 \end{cases}$ y | x

$y=4-x^2$

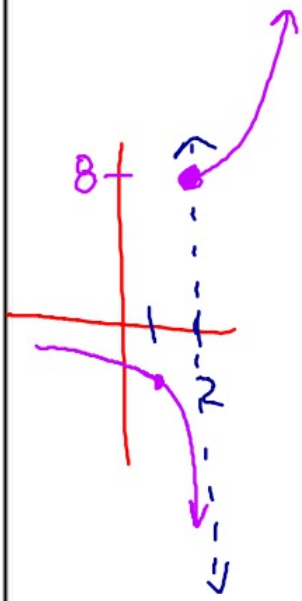
$\to (2,1)$

a) $\lim_{x\to 2^-} f(x)=$ b) $\lim_{x\to 2^+} f(x)=$ c) $\lim_{x\to 2} f(x)=$ d) f(2)= 1

$\lim_{x\to 2^-} 4-x^2=0$

$\lim_{x\to 2^+} 4-x^2=0$

$\lim_{x\to 2} 4-x^2=0$



53A. $f(x)=\begin{cases} \frac{1}{x-2} & x<2 \\ x^3 & x\geq 2 \end{cases}$

a) $\lim_{x\to 2^-} f(x)=$ b) $\lim_{x\to 2^+} f(x)=$ c) $\lim_{x\to 2} f(x)=$ DNE d) f(2)= 8

$\lim_{x\to 2^-} \frac{1}{x-2}=-\infty$

V.A.

$\lim_{x\to 2^+} x^3=8$