Period 3, Aug 16, 24

f $f(x) = \frac{x^3-1}{x-1}$,

$a^3 - b^3 = (a-b)(a^2+ab+b^2)$

$a^3+b^3 = (a+b)(a^2-ab+b^2)$

$F(1) = \frac{0}{0} = \emptyset$

$\lim_{x \to 1} F(x) = 3$

$F(x) = \frac{X^3 - 1^3}{X-1} = \frac{\cancel{(X-1)}(X^2+1\cdot X+1^2)}{\cancel{(X-1)}}$ $X \neq 1$

$F(x) = x^2+X+1$

Not continious at $X=1$

$F(1) = \emptyset$

$\lim_{x \to c} F(x)$ must Exist

$F(c)$ must Exist

$F(c) = \lim_{x \to c} F(x)$

continious at c

Let $f(x) = \begin{cases} 5-2x, & x > 2 \\ x-3, & x \le 2 \end{cases}$

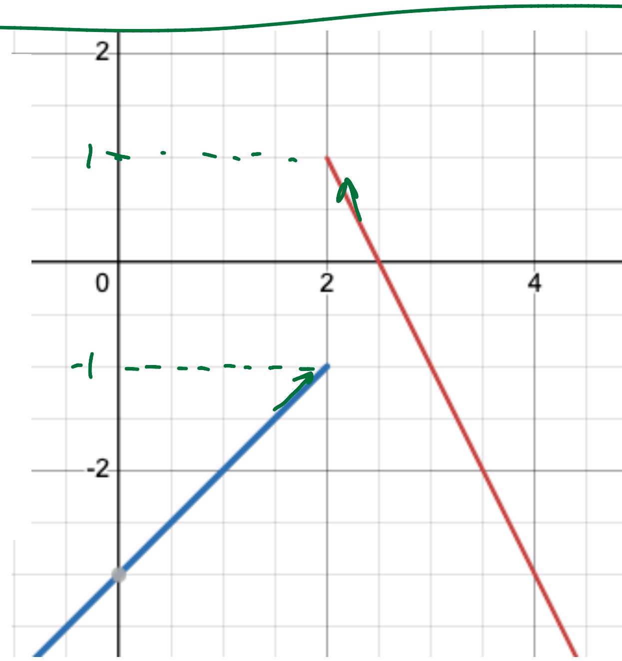
a) Graph $f(x)$.

b) Find $\lim_{x \to 2^-} f(x)$. $= -1$

c) Find $\lim_{x \to 2^+} f(x)$. $= 1$

Not The Same

d) Find $\lim_{x \to 2} f(x)$? $= \emptyset$



7. $\lim_{x\to 1} f(x)$ where:

$$f(x)=\begin{cases}3-x, x<1\\ 4, x=1\\ x^2+1, x>1\end{cases}$$

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

$\lim_{x\to 1^+} F(x) = \lim_{x\to 1^+} x^2+1 = 1^2+1 = 2$ Same

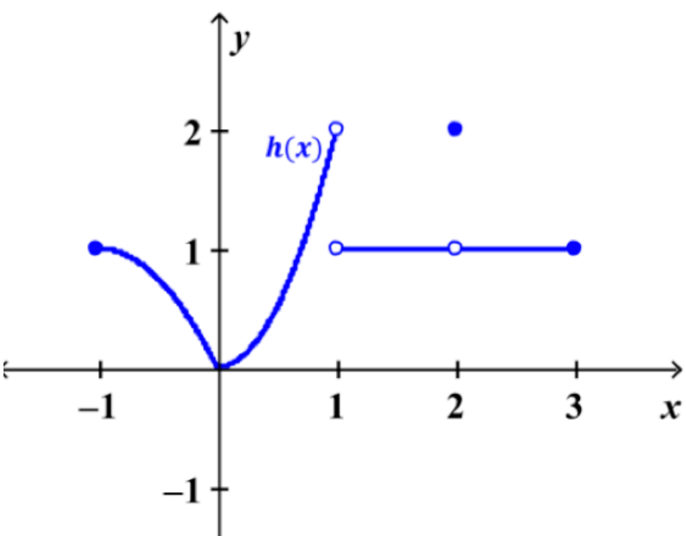
$\lim_{x\to 1} F(x) = 2$ Not The same

Not continious

$F(1) = 4$

Practice

Use the graph of the function h to decide whether the value of the given quantity exist. If it does, find it. If not, explain why.



TIP

When it fails… Use Does Not Exist (DNE) for Limit
Use Undefined (UND) for Function Value

(a) $h(-1) =$ 1

(b) $h(1) =$ Ø UND

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

(d) $\lim_{x\to 1^+} h(x) =$ 1

(e) $\lim_{x\to 1} h(x) =$ Ø DNE

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

(g) $\lim_{x\to 2^+} h(x) =$ 1

(h) $\lim_{x\to 2} h(x) =$ 1

(i) $h(2) =$ 2

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

(j) $\lim_{x\to 3} h(x) =$ Ø DNE