Clicker Q1: Limits

What is the correct first step when evaluating the following limit:

$$\lim_{x \to \frac{3}{2}} \frac{4x^2+4x-15}{2x-3} = \ldots$$

a.) $\cancel{\dfrac{(2x-3)(2x+5)}{(2x-3)}}$

4 · −15 = −60

∧ sum

10 · −6 +4

$4x^2+10x-6x-15$

$2x(2x+5)-3(2x+5)$

$(2x+5)(2x-3)$

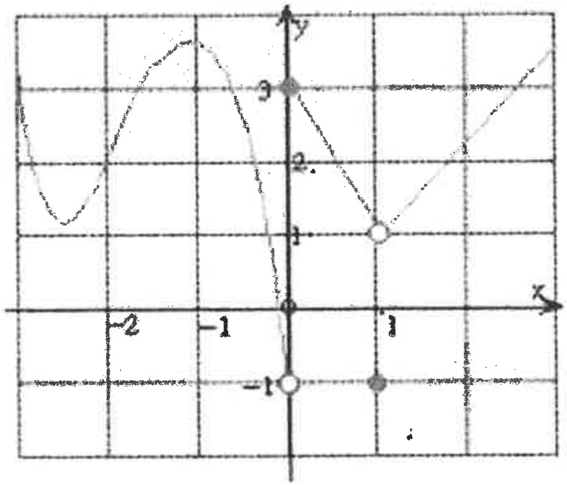
b.) $\displaystyle\lim_{x \to \frac{3}{2}} \frac{(4x-3)(x+5)}{2x-3}$

c.) $\cancel{\dfrac{(4x-3)(x+5)}{2x-3}}$

d.) $\displaystyle\lim_{x \to \frac{3}{2}} \frac{(2x-3)(2x+5)}{2x-3}$

Clicker Q2: Limits From a Picture

Given the graph of $f(x)$ below:



$f(1) = -1$

Find the following limit:

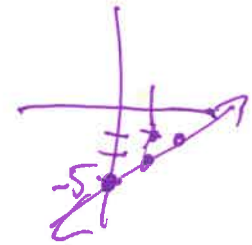
$$\lim_{x \to 1} f(x).$$

a.) 1

b.) -1

c.) DNE

d.) 3



Clicker Q3: Piecewise and One-Sided Limits

Evaluate the following limit: $\lim_{x\to 0^-} f(x)$ given that

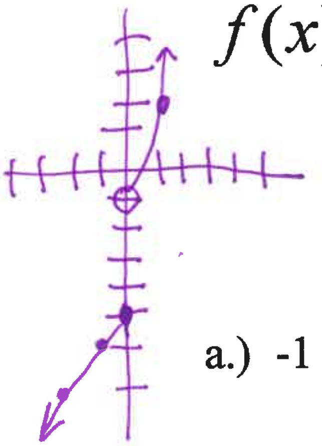
Is f cont. @ $x=0$?

left | right
$x<0$ 0 $x>0$

$$f(x)=\begin{cases} x-5 & x\le 0 \\ 3x^2-1 & x>0 \end{cases}$$

left
right

(i) $f(0)=0-5=-5$



(ii) $\lim_{x\to 0^-}(x-5)=0-5=-5$

$\lim_{x\to 0^+}(3x^2-1)=3(0)^2-1=-1$

$\lim_{x\to 0} f(x)=\text{DNE}$

a.) -1

b.) -5

(iii) $f(x)$ is not cont. @ $x=0$ b/c $\lim_{x\to 0} f(x)$ DNE

c.) DNE

also $f(0)\neq \lim_{x\to 0} f(x)$.

Clicker Q4: First Step of Derivative Limit Definition

Which expression provides the correct first step in finding the derivative of $f(x)$ with respect to x if $f(x)=9-x^2$?

A.) $$\frac{(9-(x+\Delta x)^2)-(9-x^2)}{\Delta x}$$

B.) $$f'(x)=\lim_{x\to 0}\frac{(9-(x+\Delta x)^2)-(9-x^2)}{\Delta x}$$

C.) $$f'(x)=\lim_{\Delta x\to 0}\frac{(9-(x+\Delta x)^2)-9-x^2}{\Delta x}$$

D.) $$\lim_{x\to 0}\frac{(9-(x+\Delta x)^2)-(9-x^2)}{x}$$

E.) $$f'(x)=\lim_{\Delta x\to 0}\frac{(9-(x+\Delta x)^2)-(9-x^2)}{\Delta x}$$

Clicker Q5: Evaluating a Derivative

What is the value of the derivative of $f(x)$ with respect to x at $x=5$ if $f(x)=9-x^2$?

$f'(x) = -2x$

$f'(5) = -10$

A.) $f'(x) = -x^2$

B.) $f'(5) = -2x$

C.) $f'(5) = -10$

D.) $f'(x) = -2x$

E.) $f'(5) = 0$

Clicker Q6: Continuity Review

(7.2 Notes)

Select the best choice (A., B., or C.) for the given statements:

$f(x) = x(x-3)$

i. $\boxed{f(x) = (x-5)^9}$ is continuous because it is a polynomial and all polynomials are continuous on $(-\infty, \infty)$. ✓

$x \neq 4$

4

ii. $f(x) = \dfrac{16-x^2}{x-4}$ is continuous on $(-\infty,4)\cup(4,\infty)$ because it is a rational function and rational functions are continuous on their respective domains.

$x<4$ | $x>4$

left 4 right

iii. $f(x) = \begin{cases} x-2 & x \le 4 \\ x^2-3x-2 & x>4 \end{cases}$ left — is continuous at $x=4$ because $f(4)$ is defined; $\lim\limits_{x\to 4} f(x) = 2$ and thus it exists; and $f(4) = \lim\limits_{x\to 4} f(x) = 2$.

① $f(4) = 4-2$
$= 2$ ✓

② $\lim\limits_{x\to 4^-} f = 4-2 = 2$

$\lim\limits_{x\to 4^+} f = (4)^2 - 3(4) - 2$
$= 16-12-2$
$= 4-2 = 2$ ✓

③ $f(4) = 2 = \lim\limits_{x\to 2} f(x).$

A. ONLY *i.* is true.
B. ONLY *i.* and *ii.* are true.
C. All three statements, *i.*, *ii.*, and *iii.* are true.

Clicker Q7: IROC VS. AROC

For the function: $f(x)=5x^3-4x+3$, defined on the interval [1,3], find the instantaneous rate of change at $x=3$ and average rate of change over the interval [1,3].

A. The average rate of change over the interval [1,3] is 60 and the instantaneous rate of change at $x=3$ is 131.

B. The average rate of change over the interval [1,3] is 131 and the instantaneous rate of change at $x=3$ is 60.

$f(3)-f(1)/(3-1)$

C. The average rate of change over the interval [1,3] is 61 and the instantaneous rate of change at $x=3$ is 131.

$f'=15x^2-4 \quad f'(3)= \ldots$

D. The average rate of change over the interval [1,3] is 131 and the instantaneous rate of change at $x=3$ is 61.