Name Solutions ID

UWO Calculus 1000 Quiz 2
Sept 23, 2016.

(1) Evaluate $\lim_{t\to 0}\left(\frac{1}{t\sqrt{1+t}}-\frac{1}{t}\right)$; We have $\frac{1}{t\sqrt{1+t}}-\frac{1}{t}=\frac{1-\sqrt{1+t}}{t\sqrt{1+t}}=$

$=\frac{(1-\sqrt{1+t})(1+\sqrt{1+t})}{t\sqrt{1+t}(1+\sqrt{1+t})}=\frac{1-1-t}{t\sqrt{1+t}(1+\sqrt{1+t})}=$

$=-\frac{1}{\sqrt{1+t}(1+\sqrt{1+t})}$. Therefore,

Answers:
(A) 0
(B) $-\frac{1}{2}$
(C) $\frac{1}{2}$
(D) Limit does not exist
(E) None of these

$\lim_{t\to 0}\left(\frac{1}{t\sqrt{1+t}}-\frac{1}{t}\right)=\lim_{t\to 0}-\frac{1}{\sqrt{1+t}(1+\sqrt{1+t})}=$

$=-\frac{1}{1(1+1)}=-\frac{1}{2}$.

(2) Compute $\lim_{x\to 2}\frac{x^2-4}{|x-2|}$; We have $\lim_{x\to 2^-}\frac{x^2-4}{|x-2|}=\lim_{x\to 2^-}\frac{x^2-4}{2-x}=$

$=\lim_{x\to 2^-}\frac{(x-2)(x+2)}{2-x}=\lim_{x\to 2^-}-(x+2)=-4$.

On the other hand, $\lim_{x\to 2^+}\frac{x^2-4}{|x-2|}=\lim_{x\to 2^+}\frac{(x-2)(x+2)}{x-2}=$

Answers:
(A) 2
(B) 4
(C) -4
(D) Limit does not exist
(E) None of these

$=\lim_{x\to 2^+}(x+2)=4$. Since $-4\neq 4$, the limit does not exist.

(3) The graph of the function $y = f(x)$ is represented on the figure below. Which of the following is true?

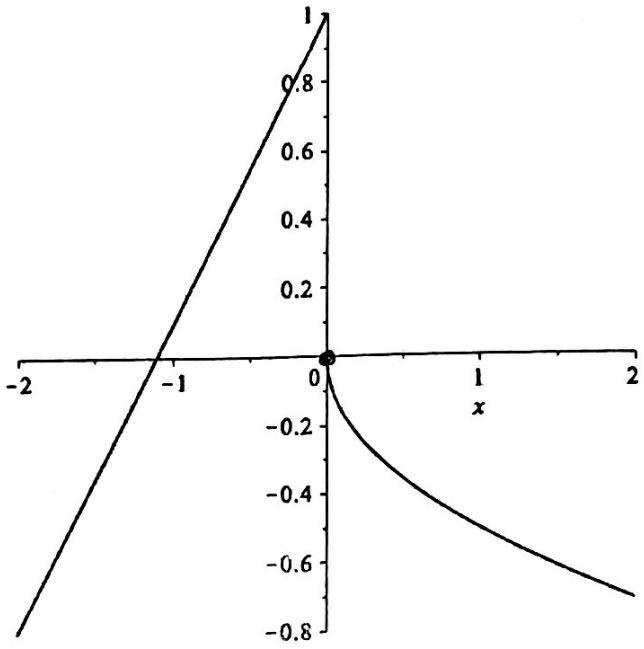

FIGURE 1. $y = f(x)$

Answers:

(A) $\lim_{x\to 0^-} f(x) = 1$ and $\lim_{x\to 0^+} f(x) = 0$

(B) $\lim_{x\to 0^-} f(x) = 1$ and $\lim_{x\to 0} f(x) = 0$

(C) $\lim_{x\to 0^-} f(x) = 0$ and $\lim_{x\to 0^+} f(x) = 1$

(D) $\lim_{x\to 0^+} f(x) = 1$ and $\lim_{x\to 0} f(x)$ does not exist

(E) None of the above is true

From the graph in Figure 1 we see that $\lim_{x\to 0^-} f(x) = 1$ and $\lim_{x\to 0^+} f(x) = 0$.

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