MATH 200 – QUIZ 2 ⊡

Name: Richard

January 22, 2015

1. $\lim\limits_{x\to0}\dfrac{\sqrt{1+x}-1}{x} = \lim\limits_{x\to0}\dfrac{\sqrt{1+x}-1}{x}\cdot\dfrac{\sqrt{1+x}+1}{\sqrt{1+x}+1} = \lim\limits_{x\to0}\dfrac{\sqrt{1+x}^{\,2}+\sqrt{1+x}-\sqrt{1+x}-1}{x\left(\sqrt{1+x}+1\right)}$

$= \lim\limits_{x\to0}\dfrac{1+x-1}{x\left(\sqrt{1+x}+1\right)} = \lim\limits_{x\to0}\dfrac{x}{x\left(\sqrt{1+x}+1\right)} = \lim\limits_{x\to0}\dfrac{1}{\sqrt{1+x}+1} = \dfrac{1}{\sqrt{1+0}+1}$

$= \dfrac{1}{\sqrt{1}+1} = \dfrac{1}{1+1} = \boxed{\dfrac{1}{2}}$

2. Answer the following questions about the function $y = f(x)$ graphed below.

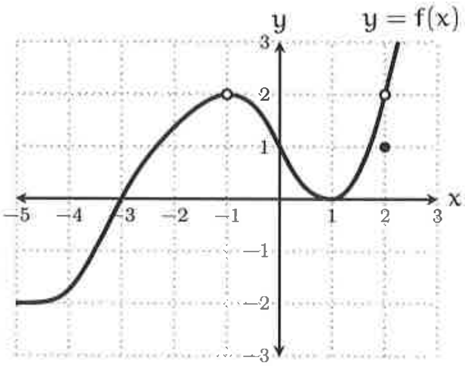
(a) $f(2) = \boxed{1}$

(b) $\lim\limits_{x\to2} f(x) = \boxed{2}$

(c) $f(-3) = \boxed{0}$

(d) $\lim\limits_{x\to-3} f(x) = \boxed{0}$

(e) $\lim\limits_{x\to-1}\dfrac{f(x)+1}{2f(x)} = \dfrac{\lim\limits_{x\to-1}\left(f(x)+1\right)}{\lim\limits_{x\to-1} 2f(x)} = \dfrac{2+1}{2\cdot2} = \boxed{\dfrac{3}{4}}$



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1. $\lim\limits_{x\to0}\dfrac{\frac{1}{2+x}-\frac{1}{2}}{x} = \lim\limits_{x\to0}\dfrac{\frac{2\cdot1}{2(2+x)}-\frac{1(2+x)}{2(2+x)}}{\frac{x}{1}} = \lim\limits_{x\to0}\dfrac{\frac{2-2-x}{2(2+x)}}{\frac{x}{1}} = \lim\limits_{x\to0}\dfrac{-x}{2(2+x)}\,\dfrac{1}{x}$

$= \lim\limits_{x\to0}\dfrac{-1}{2(2+x)} = \dfrac{-1}{2(2+0)} = \boxed{-\dfrac{1}{4}}$

2. Answer the following questions about the function $y = f(x)$ graphed below.

(a) $f(-3) = \boxed{0}$

(b) $\lim\limits_{x\to-3} f(x) = \boxed{0}$

(c) $f(-1) = \boxed{-3}$

(d) $\lim\limits_{x\to-1} f(x) = \boxed{-2}$

(e) $\lim\limits_{x\to-1}\sqrt{1-2f(x)} = \sqrt{\lim\limits_{x\to-1}\left(1-2f(x)\right)}$

$= \sqrt{\lim\limits_{x\to-1} 1 - 2\lim\limits_{x\to-1} f(x)} = \sqrt{1-2(-2)} = \boxed{\sqrt{5}}$