17. $\lim_{y \to 0} \dfrac{\sqrt{5+y} - \sqrt{5}}{y}$

$\dfrac{(\sqrt{5+y} + \sqrt{5})}{(\sqrt{5+y} + \sqrt{5})}$

$\lim_{y \to 0} \dfrac{5+y-5}{y(\sqrt{5+y} + \sqrt{5})} \cdot \dfrac{1}{1} = \dfrac{1}{2\sqrt{5}}$

$\sqrt{5} \cdot \sqrt{5}$

13. $\lim_{x\to -1} \dfrac{x^3+2x^2-x-2}{x^3+4x^2-x-4} = \dfrac{(x+1)(x^2+x-2)}{(x+1)(x^2+3x-4)}$

$-1 \mid 1 \;\; 2 \;\; -1 \;\; -2$

$\quad\quad -1 \;\; -1 \;\; 2$

$1 \;\; 1 \;\; -2 \mid 0$

$-1 \mid 1 \;\; 4 \;\; -1 \;\; -4$

$\quad\quad -1 \;\; -3 \;\; 4$

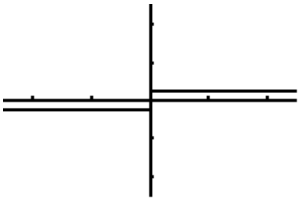
$1 \;\; 3 \;\; -4 \mid 0$

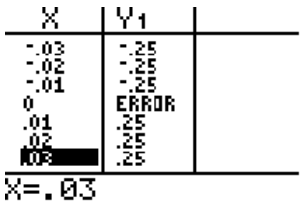
$\lim_{x\to -1} \dfrac{x^2+x-2}{x^2+3x-4} = \dfrac{-2}{-6} = \boxed{\dfrac{1}{3}}$

11-2 Evaluating Limits (continued)

Ex 1 Find the following: $\lim_{x\to 0^-} \dfrac{|x|}{(4x)} = -\dfrac{1}{4}$

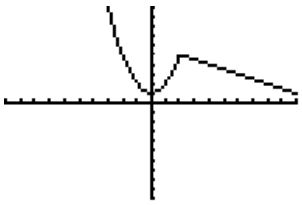
$\lim_{x\to 0} \dfrac{|x|}{x}$: D.N.E $\quad\quad \lim_{x\to 0^+} \dfrac{|x|}{(4x)} = \dfrac{1}{4}$





Ex 2 Find $\lim_{x\to 2} f(x)$ when $f(x) = \begin{cases} x^2+1, x<2 \\ -\frac{1}{2}x+6, x>2 \end{cases}$

$= 5$



X	Y1	Y2
1.96	4.8416	0
1.97	4.8809	0
1.98	4.9204	0
1.99	4.9601	0
2	0	0
2.01	0	4.995
2.02	0	4.99

X=1.97

Ex 3 For the function defined by $f(x) = 2x^2+1$

find $\lim_{h\to 0} \frac{f(x+h)-f(x)}{h}$

$(x+h)(x+h)$

$\lim_{h\to 0} \frac{2(x+h)^2+1-(2x^2+1)}{h}$

$\lim_{h\to 0} \frac{2(x^2+2xh+h^2)+1-2x^2-1}{h}$

$\lim_{h\to 0} \frac{2x^2+4xh+2h^2+1-2x^2-1}{h}$

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

Practice
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