SCalc8 1.6.001. (3334311) (Remove) -- View 4m

Given that

$\lim_{x\to 2} f(x) = 9$ $\lim_{x\to 2} g(x) = -2$ $\lim_{x\to 2} h(x) = 0,$

find the limits, if they exist. (If an answer does not exist, enter DNE.)

(a) $\lim_{x\to 2} [f(x) + 4g(x)] = 9 + 4(-2) = 1$

(b) $\lim_{x\to 2} [g(x)] = -2$

(c) $\lim_{x\to 2} \sqrt{f(x)^3} = (9)^{\frac{3}{2}} = 3^3 = 27$

(d) $\lim_{x\to 2} \frac{2f(x)}{g(x)} = \frac{2(9)}{-2} = -9$

(e) $\lim_{x\to 2} \frac{g(x)}{h(x)}$ $\nexists$ b/c $\lim h = 0$

Informally: Assume $\lim f$ & $\lim g$ are real #s.

$\lim(f \pm g) = \lim f \pm \lim g$

$\lim(fg) = (\lim f)(\lim g)$

$\lim\left(\frac{f}{g}\right) = \frac{\lim f}{\lim g}$ (if $\lim g \neq 0$)

$\lim(f^n) = (\lim f)^n$ $n \in \mathbb{Q}$

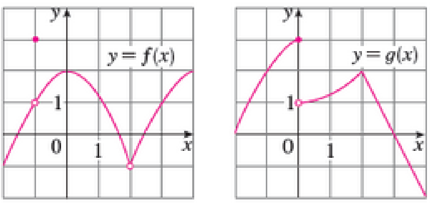
Fraction

$\lim(f^{2/3})$

$(\lim f)^{2/3}$

2. Question Details SCalc8 1.6.002.

The graphs of *f* and *g* are given. Use them to evaluate each limit, if it exists. (If an answer does not exist, enter DNE.)



(a) $\lim_{x\to 2} [f(x) + g(x)] = -1 + 2 = \boxed{1} = \lim_{x\to 2}(f+g)$

(b) $\lim_{x\to 0} [f(x) - g(x)]$ $\boxed{\nexists}$

(c) $\lim_{x\to -1} [f(x)g(x)] = (1)(2) = \boxed{2} = \lim_{x\to -1}(fg)$

(d) $\lim_{x\to 3} \frac{f(x)}{g(x)}$ $= \text{"}\frac{-1}{0}\text{"}$ $\boxed{\nexists}$

(e) $\lim_{x\to 2} [x^2 f(x)] = 2^2(-1) = \boxed{-4}$ $\circledast = \lim_{x\to 2}(x^2) \lim_{x\to 2} f(x)$

$= 2^2 \cdot -1$

(f) $f(-1) + \lim_{x\to -1} g(x)$

$= 3 + 2 = \boxed{5}$

FACT

$\lim_{x\to c} x = c$

$\lim_{x\to c} x^n = c^n$, $\forall\, n \in \mathbb{Q}$, with caveat for negative powers & $c = 0$.

3. Question Details SCalc8 1.6.003.

Evaluate the limit using the appropriate Limit Law(s). (If an answer does not exist, enter DNE.)

$$\lim_{x \to 4} (5x^3 - 4x^2 + x - 2)$$

c is constant, then $\lim (cf) = c \lim f$

$\lim c = c$

$= \lim 5x^3 - \lim 4x^2 + \lim x - \lim 2$

$= 5\lim x^3 - 4\lim x^2 + \lim x - \lim 2$

$= 5(4)^3 - 4(4)^2 + 4 - 2$

$= 320 - 64 + 2 = 258?$

$320 - 64 = 256$

4. Question Details SCalc8 1.6.005.

Evaluate the limit using the appropriate Limit Law(s). (If an answer does not exist, enter DNE.)

$$\lim_{t \to -2} \frac{t^4 - 4}{2t^2 - 3t + 4} = \frac{(-2)^4 - 4}{2(-2)^2 - 3(-2) + 4}$$

$$= \frac{16 - 4}{8 + 6 + 4} = \frac{12}{18} = \boxed{\frac{2}{3}}$$

If you CAN plug in the #, directly, DO IT! Concerns here, was denominator = 0, but that didn't happen, so plug right in!

5. Question Details

Evaluate the limit using the appropriate Limit Law(s). (If an answer does not exist, enter DNE.)

$$\lim_{u \to -1} \sqrt{u^4 + 3u + 3} = \sqrt{(-1)^4 + 3(-1) + 3} = \sqrt{1 - 3 + 3} = \sqrt{1} = \boxed{1}$$

6. Question Details SCalc8 1.6.007.

Evaluate the limit using the appropriate Limit Law(s). (If an answer does not exist, enter DNE.)

$$\lim_{x\to 8}\left[\left(3+\sqrt[3]{x}\right)\left(5-5x^2+x^3\right)\right]$$ needs brackets.

$$=\left[(3+2)\left(5-(5)(8)^2+8^3\right)\right]$$

$$=(5)(5-320+512)=5(197)=\boxed{985}$$

$3 \quad 64$, 8, 512, -320, 192, $+5$

$4 \; 197$, 5, 985

7. Question Details SCalc8 1.6.008.

Evaluate the limit using the appropriate Limit Law(s). (If an answer does not exist, enter DNE.)

$$\lim_{t\to 2}\left(\frac{t^2-7}{t^3-4t+6}\right)^2 : \left(\frac{2^2-7}{2^3-4(2)+6}\right)^2=\left(\frac{-3}{6}\right)^2=\left(-\frac{1}{2}\right)^2=\boxed{\frac{1}{4}}.$$

Plug it in if it's in the domain!

8. Question Details SCalc8 1.6.009.

Evaluate the limit using the appropriate Limit Law(s). (If an answer does not exist, enter DNE.)

$$\lim_{x\to 2}\sqrt{\frac{5x^2+5}{5x-1}}=\sqrt{\frac{5(2)^2+5}{5(2)-1}}=\sqrt{\frac{25}{9}}=\boxed{\frac{5}{3}}$$

9. Question Details SCalc8 1.6.010

(a) What is wrong with the following equation?

$$f(x) = \frac{x^2 + x - 20}{x - 4} = x + 5$$

$f(x)$ $\nexists$ @ $x = 4$. $x+5$ does.

(b) In view of part (a), explain why the equation

$$\lim_{x \to 4} \frac{x^2 + x - 20}{x - 4} = \lim_{x \to 4} (x + 5)$$

is correct.

They agree everywhere, except $x=4$.

$$\frac{x^2+x-20}{x-4} = \frac{(x+5)(x-4)}{x-4} = x+5 \text{ if } x \neq 4$$

$$\boxed{\xrightarrow{x \to 4} 4+5 = 9 = \lim_{x \to 4} f(x)}$$

10. Question Details SCalc8 1.6.013.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x \to 3} \frac{x^2 - 7x + 6}{x - 3} = \lim_{x \to 3} \frac{(x-6)(x-1)}{x-3} \quad \nexists .$$

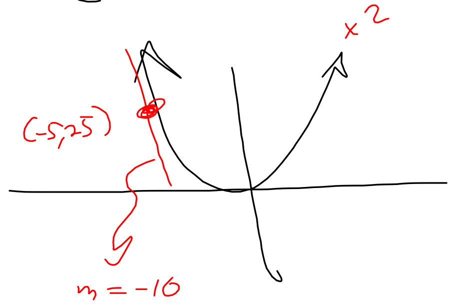
11. Question Details SCalc8 1.6.017.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{h \to 0} \frac{(-5 + h)^2 - 25}{h} = \lim_{h \to 0} \frac{(-5)^2 + (2)(-5)(h) + h^2 - 25}{h}$$

$$= \lim_{h \to 0} \frac{25 - 10h + h^2 - 25}{h} = \lim_{h \to 0} \frac{-10h + h^2}{h} = \lim_{h \to 0} \frac{h(-10+h)}{h} = \lim_{h \to 0} (-10+h) = -10$$

Slope of x^2 @ $x = -5$ is $m_{tan} = -10$!



12. Question Details SCalc8 1.6.020.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.).

$$\lim_{h \to 0} \frac{\sqrt{1+h}-1}{h}.$$

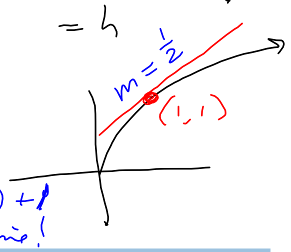
STYLE: Leave $\lim_{h\to 0}$ for last step!

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

$(\sqrt{1+h}-1)(\sqrt{1+h}+1) = 1+h-1 = h$

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

$$= \frac{1}{\sqrt{1+h}+1} \xrightarrow{h\to 0} \frac{1}{\sqrt{1}+1} = \frac{1}{1+1} = \boxed{\frac{1}{2}}$$



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

tan line!

13. Question Details SCalc8 1.6.024.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

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

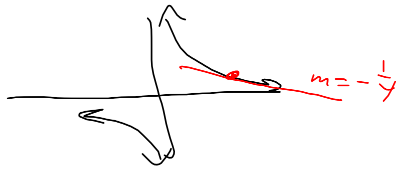
The slope of $f(x)=\frac{1}{x}$ @ $x=2$!

$$\lim_{h\to 0} \frac{f(2+h)-f(2)}{h} = \lim_{h\to 0} \frac{\frac{1}{2+h}-\frac{1}{2}}{h} = \#13!$$

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

$$= \frac{1}{h}\cdot\left(\frac{2-(2+h)}{2(2+h)}\right) = \frac{1}{h}\left(\frac{-h}{2(2+h)}\right)$$

$$= \frac{-1}{2(2+h)} \xrightarrow{h\to 0} \boxed{-\frac{1}{4}}$$



14. Question Details SCalc8 1.6.026.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{t \to 0}\left(\frac{8}{t}-\frac{8}{t^2+t}\right)$$

$t^2+t = t(t+1) = \text{LCD}$

LCD

$$\left(\frac{8}{t}\right)\left(\frac{t+1}{t+1}\right) - \frac{8}{\text{LCD}}$$

$$= \frac{8t+8-8}{\text{LCD}} = \frac{8\cancel{t}}{\cancel{t}(t+1)} = \frac{8}{t+1} \xrightarrow{t\to 0} \frac{8}{1} = \boxed{8}$$

15. Question Details SCalc8 1.6.027.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x\to 25} \frac{5-\sqrt{x}}{25x-x^2}$$

$$\left(\frac{5-\sqrt{x}}{25x-x^2}\right)\left(\frac{5+\sqrt{x}}{5+\sqrt{x}}\right) = \frac{\cancel{25-x}}{x\,(\cancel{25-x})(5+\sqrt{x})} = \frac{1}{x(\sqrt{x}+5)} \xrightarrow{x\to 25} \frac{1}{25(5+5)}$$

$$= \frac{1}{25^2} = \boxed{\frac{1}{625}}$$

16. Question Details SCalc8 1.6.031.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{h\to 0} \frac{(x+h)^3 - x^3}{h}$$

$$(x+h)^3$$

$$= 1x^3h^0 + 3x^2h + 3xh^2 + 1x^0h^3$$

$$= x^3 + 3x^2h + 3xh^2 + h^3$$

1
1 1
1 2 1
1 3 3 1

$$\frac{\cancel{x^3} + 3x^2h + 3xh^2 + h^3 - x^3}{h}$$

$$= \frac{h(3x^2+3xh+h^2)}{h} = 3x^2+3xh+h^2$$

$$\xrightarrow{h\to 0} \boxed{3x^2}$$

17. Question Details SCalc8 1.6.033. [3354477

A graphing calculator is recommended.

(a) Estimate the value of

$$\lim_{x\to 0} \frac{x}{\sqrt{1+3x}-1}$$

by graphing the function $f(x) = x/(\sqrt{1+3x} - 1)$. (Round your answer to one decimal place.)

(b) Make a table of values of $f(x)$ for x close to 0 and guess the value of the limit. (Round your answer to six decimal places.)

(c) Use the Limit Laws to find the exact value of $\lim_{x\to 0} \frac{x}{\sqrt{1+3x}-1}$.

Analytic Way $\left(\frac{x}{\sqrt{3x+1}-1}\right)\left(\frac{\sqrt{3x+1}+1}{\sqrt{3x+1}+1}\right)$

$$= \frac{x(\sqrt{3x+1}+1)}{(3x+1)-1} = \frac{x(\sqrt{3x+1}+1)}{3x} = \frac{\sqrt{3x+1}+1}{3}$$

$$\xrightarrow{x\to 0} \frac{\sqrt{1}+1}{3} = \frac{2}{3}$$

x	f(x)
1	1
0.5	0.86038
0.25	0.774292
0.125	0.724201
0.0625	0.696575
0.03125	0.681942
0.015625	0.67439
0.007813	0.67055
0.003906	0.668614
0.001953	0.667642
0.000977	0.667155
0.000488	0.666911
0.000244	0.666789
0.000122	0.666728

$$f(x) = \frac{x}{\sqrt{1+3x}-1}$$

Aims Community College | Index of /201/videos/chapter-... | plot(x/(sqrt(3x+1)-1) from ...

www.wolframalpha.com/input/?i=plot(x%2F(sqrt(3x%2B1)-1)+from+-1+to+5

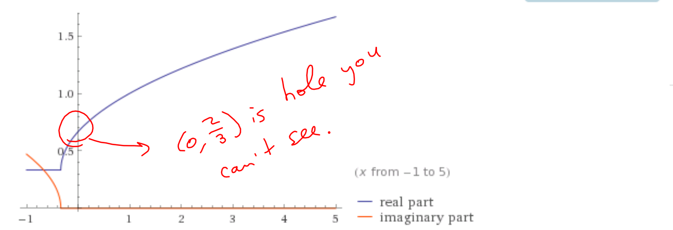
plot(x/(sqrt(3x+1)-1) from -1 to 5

Web Apps Examples Random

plot $\frac{x}{\sqrt{3x+1}-1}$ $x = -1$ to 5

Open code

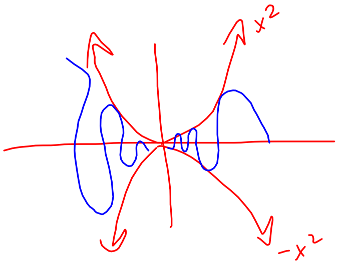
Plot: Complex-valued plot



18. Question Details SCalc8 1.6.035. [3354153]

A graphing calculator is recommended.

Use the Squeeze Theorem to show that $\lim_{x \to 0} (x^2 \cos(6\pi x)) = 0$. Illustrate by graphing the functions $f(x) = -x^2$, $g(x) = x^2 \cos(6\pi x)$, and $h(x) = x^2$ on the same screen.



x^2 is dampening cosine oscillates between -1 & $+1$.
$x^2 \cos(6\pi x)$ oscillates between $+x^2$ & $-x^2$

$$f \le g \le h$$
$$\lim f = \lim h$$
$$\Rightarrow \lim g = \lim f = \lim h$$

$$-x^2 \le x^2 \cos(6\pi x) \le x^2$$

$x \to 0$ ↓ ↓ $x \to 0$

$$0 \le \lim_{x \to 0} x^2 \cos(6\pi x) \le 0$$

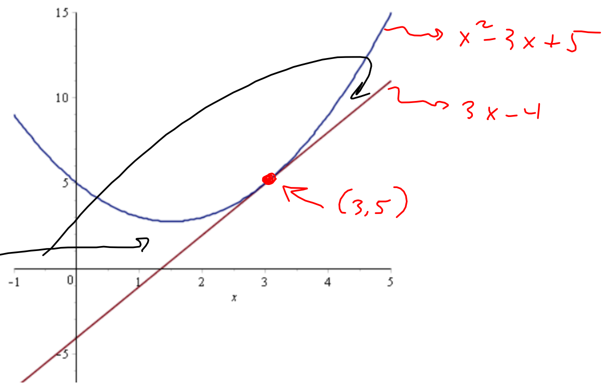
i.e. $\lim_{x \to 0} x^2 \cos(6\pi x) = 0$ by Squeeze Theorem!

19. Question Details SCalc8 1.6.037. [

If $3x - 4 \le f(x) \le x^2 - 3x + 5$ for $x \ge 0$, find $\lim_{x \to 3} f(x)$.

$$3(3) - 4 = 5 \le \lim_{x \to 3} f(x) \le 3^2 - 3(3) + 5 = 5$$
$$\lim_{x \to 3} f(x) = 5$$

f(x) lives here



20. Question Details SCalc8 1.6.039.

Evaluate the limit, if it exists. (If an answer does not exist, enter DNE.)

$\lim_{x\to 0} x^2 \cos\left(\frac{3}{x}\right) = 0$, by Squeeze.

$-x^2 \le x^2\cos\left(\frac{3}{x}\right) \le x^2$

$\cos\left(\frac{3}{x}\right)$ approaches Nothing as $x \to 0$, but the x^2 drags it down to zero.

KEY: $\cos\left(\frac{3}{x}\right)$ is bounded above & below by ± 1

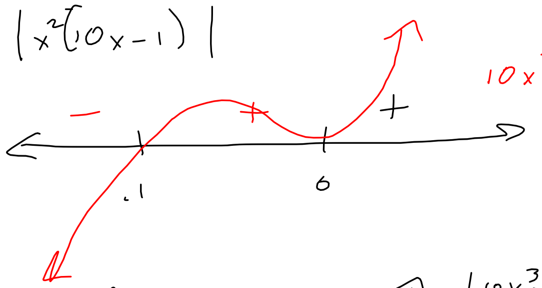
Question Details SCalc8 1.6.043.

Find the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x\to 0.1^-} \frac{10x-1}{|10x^3 - x^2|}$$

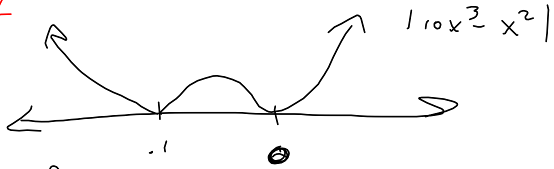
Quick analysis of $|10x^3 - x^2|$

$|x^2(10x-1)|$



$$\frac{10x-1}{|x^2||10x-1|} =$$

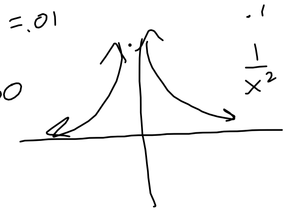
$$\begin{cases} \dfrac{10x-1}{x^2(10x-1)} & \text{if } x \ge .1 \\ -\dfrac{10x-1}{x^2(10x-1)} & \text{if } < .1 \end{cases}$$



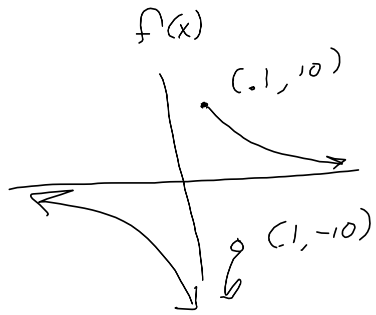
$$= \begin{cases} \dfrac{1}{x^2} & \text{if } x \ge .1 \\ -\dfrac{1}{x^2} & \text{if } x < .1 \end{cases}$$

$.1^2 = \frac{1}{100} = .01$

$\frac{1}{.1^2} = 100$



$x \to .1^-$ $\boxed{-10}$



22. Question Details SCalc8 1.6.045

Find the limit, if it exists. (If an answer does not exist, enter DNE.)

$$\lim_{x\to 0^-} \left(\frac{2}{x} - \frac{2}{|x|}\right) = \lim_{x\to 0^-} f(x)$$

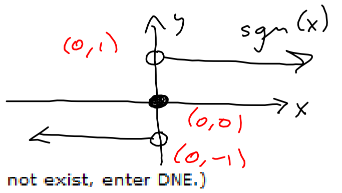
$$\frac{2}{x} - \frac{2}{|x|} = \begin{cases} \dfrac{2}{x} - \dfrac{2}{x} & \text{if } x \ge 0 \\ \dfrac{2}{x} - \dfrac{2}{-x} & \text{if } x < 0 \end{cases} = \begin{cases} 0 & \text{if } x \ge 0 \\ \dfrac{4}{x} & \text{if } x < 0 \end{cases}$$

So, $\lim_{x\to 0^-} f(x) = -\infty$ (or just say $\nexists$)

23. Question Details SCalc8 1.6.047

The *signum* (or sign) *function*, denoted by sgn, is defined by

$$\operatorname{sgn} x = \begin{cases} -1 & \text{if } x < 0 \\ 0 & \text{if } x = 0 \\ 1 & \text{if } x > 0 \end{cases}.$$



(a) Sketch the graph of this function.

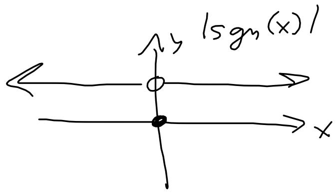
(b) Find each of the following limits. (If an answer does not exist, enter DNE.)

(i) $\lim_{x \to 0^+} \operatorname{sgn} x = 1$

(ii) $\lim_{x \to 0^-} \operatorname{sgn} x = -1$

(iii) $\lim_{x \to 0} \operatorname{sgn} x \; \nexists$

(iv) $\lim_{x \to 0} |\operatorname{sgn} x| = 1$



24. Question Details SCalc8 1.6.050

Let

$$f(x) = \begin{cases} x^2 + 2 & \text{if } x < 1 \\ (x - 3)^2 & \text{if } x \geq 1 \end{cases}.$$

(a) Find the following limits. (If an answer does not exist, enter DNE.)

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

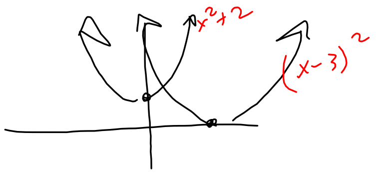
$\lim_{x \to 1^+} f(x) = \lim_{x \to 1^+} ((x-3)^2) = (1-3)^2 = (-2)^2 = 4$

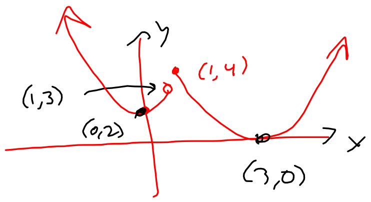
$$f(x) = \begin{cases} x^2+2 & ; \text{if } x < 1 \\ (x-3)^2 & ; \text{if } x \geq 0 \end{cases}$$

(b) Does $\lim_{x \to 1} f(x)$ exist? No. $\lim_{x \to 1^-} f(x) = 3 \neq 4 = \lim_{x \to 1^+} f(x)$

"Left- & right-hand limits disagree!"

(c) Sketch the graph of f.

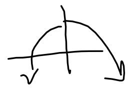




25. Question Details SCalc8 1.6.052.

Let

$$g(x) = \begin{cases} x & \text{if } x < 1 \\ 5 & \text{if } x = 1 \\ 2 - x^2 & \text{if } 1 < x \le 2 \\ x - 1 & \text{if } x > 2 \end{cases}$$



(a) Evaluate each of the following, if it exists. (If an answer does not exist, enter DNE.)

(i) $\lim_{x \to 1^-} g(x) = 1$

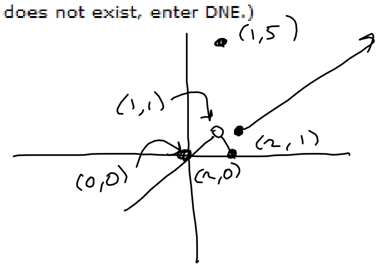
(ii) $\lim_{x \to 1^+} g(x) = 2 - 1^2 = 1$

(iii) $g(1) = 5$!?

(iv) $\lim_{x \to 2^-} g(x) = 2 - 2^2 = 0$

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

(vi) $\lim_{x \to 2} g(x)$ $\nexists$. Left & right disagree.



(b) Sketch the graph of g.

26. Question Details SCalc8 1.6.053. [33916

(a) If the symbol $[\![\ ]\!]$ denotes the greatest integer function defined in this example, evaluate the following. (If an answer does not exist, enter DNE.)

(i) $\lim_{x \to -3^+} [\![x]\!] = -3$

(ii) $\lim_{x \to -3} [\![x]\!]$ $\nexists$

(iii) $\lim_{x \to -3.4} [\![x]\!] = -4$

$[\![x]\!]$ = greatest integer $\le x$

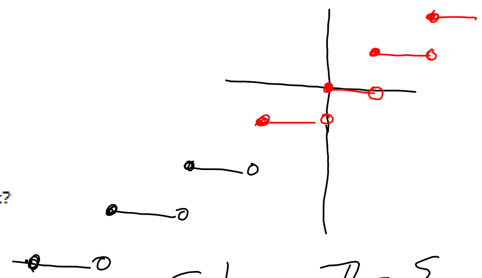
$[\![5.2]\!] = 5$

(b) If n is an integer, evaluate the following.

(i) $\lim_{x \to n^-} [\![x]\!] = n - 1$

(ii) $\lim_{x \to n^+} [\![x]\!] = n$

(c) For what values of a does $\lim_{x \to a} [\![x]\!]$ exist?



$\forall a \notin \mathbb{Z}$

For all a that are not in the integers.

Integers $\mathbb{Z} = \{\ldots, -2, -1, 0, 1, 2, \ldots\}$

Naturals $\mathbb{N} = \{1, 2, 3, \ldots\}$

Rationals $\mathbb{Q} = \{\frac{a}{b} \mid a, b \in \mathbb{Z} \text{ and } b \neq 0\}$

Reals $\mathbb{R}$ = All reals

Irrationals $\mathbb{R} \setminus \mathbb{Q}$ = Irrationals!

27. Question Details SCalc8 1.6.056. [3354232]

In the theory of relativity, the Lorentz contraction formula

$$L = L_0\sqrt{1 - v^2/c^2}$$

expresses the length L of an object as a function of its velocity v with respect to an observer, where L_0 is the length of the object at rest and c is the speed of light. Find $\lim_{v\to c^-} L$.

Why is a left-hand limit necessary?

Speed of light's the ceiling for velocity for any body with mass.
Mathematically
$\sqrt{1-v^2/c^2} \notin \mathbb{R}$ if $v > c$,
so $v \to c^-$ is only thing that makes sense, physically & by our model.

28. Question Details SCalc8 1.6.059.

If $\lim_{x\to 1} \frac{f(x) - 8}{x - 1} = 10$, evaluate $\lim_{x\to 1} f(x)$.

$f(x) \xrightarrow{x\to 1} 8$ for $\lim_{x\to 1} \frac{f(x)-8}{x-1}$ to converge.
For it to equal 10 says, in some sense, $f(x) \xrightarrow{x\to 1} 8$ 10 times faster than $x \to 1$

29. Question Details SCalc8 1.6.060.

If $\lim_{x\to 0} \frac{f(x)}{x^2} = 8$, evaluate the following limits.

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

(b) $\lim_{x\to 0} \frac{f(x)}{x} = \lim_{x\to 0} \frac{x}{x}\cdot\frac{f(x)}{x} = \lim_{x\to 0} \frac{x\,f(x)}{x^2} = \lim_{x\to 0} x \lim_{x\to 0} \frac{f(x)}{x^2}$

$= 0!$

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30. Question Details SCalc8 1.6.062.

Show by means of an example that $\lim_{x\to a} [f(x) + g(x)]$ may exist even though neither $\lim_{x\to a} f(x)$ nor $\lim_{x\to a} g(x)$ exists.

$a=0$, $f(x) = \frac{1}{x}$, $g(x) = -\frac{1}{x}$

$\lim_{x\to 0} f(x) \nexists$, $\lim_{x\to 0} g(x) \nexists$, but

$\lim_{x\to 0} (f(x)+g(x)) = \lim_{x\to 0} \left[\frac{1}{x} - \frac{1}{x}\right] = \lim_{x\to 0} [0] = 0.$

31. Question Details SCalc8 1.6.065.

Find the number a such that the limit exists.

$$\lim_{x\to -2} \frac{4x^2 + ax + a + 12}{x^2 + x - 2}$$

Find the value of the limit.

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

So, need $4x^2 + ax + a + 12 \xrightarrow{x\to -2} 0$

$$\begin{array}{r|rrr} -2 & 4 & a & a+12 \\ & & -8 & -2a+16 \\ \hline & 4 & a-8 & -a+28 \end{array} \quad \stackrel{\text{SET}}{=} 0$$

$a = 28$!?

Other way

$4(-2)^2 + a(-2) + a + 12 \stackrel{\text{SET}}{=} 0$

$16 - 2a + a + 12$

$= 28 - a = 0 \Rightarrow$

$a = 28$

$4x^2 + 28x + 28 + 12$

$= 4x^2 + 28x + 40$

$= x^2 + 7x + 10$

$= (x+5)(x+2) \Rightarrow$

$f(x) = \frac{(x+5)\cancel{(x+2)}}{\cancel{(x+2)}(x-1)} = \frac{x+5}{x-1}$, $x \neq -2$ $\xrightarrow{x\to -2} \frac{-2+5}{-2-1}$

$= \frac{3}{-3} = \boxed{-1}$