NEY

WHAT DID THE COLLEGE FRESHMAN WHO FAILED HIS FIRST CALCULUS TEST HAVE IN COMMON WITH THE COLLEGE FRESHMAN WHO WAS FINED FOR DRIVING 60 MI/HR IN A 30 MI/HR ZONE?

Match each expression with its limit.

1) $\lim_{x\to 3} x-1 =$ 2	2) $\lim_{x\to 2} \frac{x-2}{x} =$ 0	3) $\lim_{z\to 1} z^2+3z-2 =$ 2
4) $\lim_{z\to 2^-} \frac{1}{z-2} =$ $-\infty$	5) $\lim_{z\to 2^+} \frac{1}{z-2} =$ ∞	6) $\lim_{z\to 2} \frac{1}{z-2} =$ DNE
7) $\lim_{x\to 3} \frac{x^2-2x-3}{x-3} =$ 4	8) $\lim_{x\to -1} \frac{x^2-2x-3}{x-3} =$ 0	9) $\lim_{t\to 3} \lvert t-3\rvert =$ 0
10) $\lim_{x\to 1} \frac{x^2-1}{x-1} =$ 2	11) $\lim_{x\to -1} \frac{x^2-1}{x-1} =$ 0	12) $\lim_{x\to 1} \frac{x-1}{x^2-1} =$ $\frac{1}{2}$
13) $\lim_{x\to -1} \frac{x-1}{x^2-1} =$ DNE	14) $\lim_{y\to 5} \frac{y^2-2y-8}{y-4} =$ 7	15) $\lim_{y\to 4} \frac{y^2-2y-8}{y-4} =$ 6
16) $\lim_{s\to \infty} \frac{s}{2s+1} =$ $\frac{1}{2}$	17) $\lim_{s\to \infty} \frac{2s}{3s+1} =$ $\frac{2}{3}$	18) $\lim_{s\to \infty} \frac{s^2}{s+1} =$ ∞
19) $\lim_{s\to -\infty} \frac{s^2}{s+1} =$ $-\infty$	20) $\lim_{s\to -\infty} \frac{s^3}{s+1} =$ ∞	21) $\lim_{y\to \infty} \frac{2y^2+y-5}{4y^2+5y+2} =$ $\frac{1}{2}$
22) $\lim_{x\to 1} \frac{1-x}{1-\sqrt{x}} =$ 2	23) $\lim_{x\to 2} \frac{\frac{1}{x}-\frac{1}{2}}{x-2} =$ $-\frac{1}{4}$	24) $\lim_{r\to 4} \frac{\sqrt{r-3}-1}{r-4} =$ $\frac{1}{2}$
25) $\lim_{x\to 0^-} y=\begin{cases}2x-1, & x\le 0\\ 1-2x, & x>0\end{cases}$ −1	26) $\lim_{x\to 0^+} y=\begin{cases}2x-1, & x\le 0\\ 1-2x, & x>0\end{cases}$ 1	27) $\lim_{x\to 0} y=\begin{cases}2x-1, & x\le 0\\ 1-2x, & x>0\end{cases}$ DNE

Limits.

A. -4	D. 4	E. 0	H. $-\infty$	I. $\frac{1}{2}$	K. 6	L. $-\frac{1}{4}$
M. 7	N. none	R. 1	S. ∞	T. 2	U. $\frac{2}{3}$	W. -1

N	E	I	T	H	E	R
6	11	24	3	4	2	26

S	T	U	D	E	N	T
5	22	17	7	8	27	1

K	N	E	W
15	13	9	25

H	I	S
19	16	20

L	I	M	I	T	S
23	21	14	12	10	18

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1) $\lim_{x\to 3} x-1 = 3-1 = 2$

2) $\lim_{x\to 2} \frac{x-2}{x} = \frac{2-2}{2} = 0$

3) $\lim_{z\to 1} z^2+3z-2 = 1+3-2 = 2$

4) $\lim_{z\to 2^-} \frac{1}{z-2} \to \frac{1}{\text{small neg}} = -\infty$

5) $\lim_{z\to 2^+} \frac{1}{z-2} \to \frac{1}{\text{small pos}} = \infty$

6) $\lim_{z\to 2} \frac{1}{z-2} \to DNE$

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

$\lim_{x\to 3} (x+1) = 3+1 = 4$

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

9) $\lim_{t\to 3} |t-3| = 0$

10) $\lim_{x\to 1} \frac{x^2-1}{x-1} = \frac{(x+1)(x-1)}{(x-1)} = x+1$

$\lim_{x\to 1} x+1 = 2$

11) $\lim_{x\to -1} \frac{x^2-1}{x-1} = \lim_{x\to -1} x+1 = 0$

12) $\lim_{x\to 1} \frac{x-1}{x^2-1} = \frac{(x-1)}{(x+1)(x-1)} = \frac{1}{x+1}$

$\lim_{x\to 1} \frac{1}{x+1} = \frac{1}{2}$

13) $\lim_{x\to -1} \frac{x-1}{x^2-1} = \lim_{x\to -1} \frac{1}{x+1} \to$ DNE

14) $\lim_{y\to 5} \frac{y^2-2y-8}{y-4} = \frac{(y-4)(y+2)}{(y-4)} = y+2$

$\lim_{y\to 5} y+2 = 7$

15) $\lim_{y\to 4} \frac{y^2-2y-8}{y-4} = \lim_{y\to 4} y+2 = 6$

16) $\lim_{s\to\infty} \frac{s}{2s+1} = \frac{1}{2}$

17) $\lim_{s\to\infty} \frac{2s}{3s+1} = \frac{2}{3}$

18) $\lim_{s\to\infty} \frac{s^2}{s+1} = \infty$

19) $\lim_{s\to -\infty} \frac{s^2}{s+1} = -\infty$

20) $\lim_{s\to -\infty} \frac{s^3}{s+1} = \infty$

21) $\lim_{y\to\infty} \frac{2y^2+y-5}{4y^2+5y+2} = \frac{1}{2}$

22) $\lim_{x\to 1} \frac{1-x}{1-\sqrt{x}} \cdot \frac{1+\sqrt{x}}{1+\sqrt{x}} = \frac{(1-x)(1+\sqrt{x})}{(1-x)} = 1+\sqrt{x}$

$\lim_{x\to 1} 1+\sqrt{x} = 2$

23) $\lim_{x\to 2} \left(\frac{\frac{1}{x}-\frac{1}{2}}{x-2}\right)\frac{2x}{2x}$

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

$\lim_{x\to 2} \frac{-1}{2x} = \frac{-1}{4}$

24) $\lim_{r\to 4} \frac{\sqrt{r-3}-1}{r-4} \cdot \frac{\sqrt{r-3}+1}{\sqrt{r-3}+1}$

$\frac{r-3-1}{(r-4)(\sqrt{r-3}+1)} = \frac{1}{\sqrt{r-3}+1}$

$\lim_{r\to 4} \frac{1}{\sqrt{r-3}+1} = \frac{1}{2}$

25) $2(0)-1 = -1$

26) $1-2(0) = 1$

27) LH $\neq$ RH $\therefore$ Limit DNE

Sammit

What did one math book say to the other?

A DON'	B 'T	C BO	D TH	E ER
F ME	G ---	H I	I 'VE	J GOT
K MY	L OWN	M PRO	N BL	O EMS

Directions: Evaluate each limit and find your answer in one of the answer columns. Notice the letters next to the answer. Write these letters in the box that has the same letter as the exercise. Put the letters together to form words and you will find out the answer to the question!

$(x-5)(x^2+5x+25)$

A $\lim_{x\to 4^-} x-\sqrt{16-x^2}$ 4

D $\lim_{x\to 5} \frac{x^3-125}{x-5}$ 75

N $\lim_{x\to 9} \frac{x-9}{\sqrt{x}-3}$ $\frac{(x-9)}{\sqrt{x}-3}\cdot\frac{(\sqrt{x}+3)}{\sqrt{x}+3}$

VA

G $\lim_{x\to 3} \frac{x^3-x^2-5x-3}{x-3}$ 16

J $\lim_{x\to 4} \frac{\frac{1}{x}-\frac{1}{4}}{x-4}$ $\frac{4-x}{4x}\cdot\frac{1}{x-4}$ $-\frac{1}{16}$

F $\lim_{x\to\infty} \frac{5x^2-3x+1}{2-3x^2}$ $-\frac{5}{3}$

M $\lim_{x\to 2} \frac{1}{(x-2)^2}$ VA ∞

B $\lim_{x\to \frac{1}{2}^-} \frac{1}{2x-1}$ small neg $-\infty$

L $\lim_{x\to-\infty} \frac{6x}{\sqrt{9x^2+1}}$ $\frac{-6}{3}=-2$

E $\lim_{x\to 2^+} \frac{|x-2|}{x-2}$ $\frac{+}{+}$ 1

H $\lim_{x\to 6} \sqrt{36-x^2}$ I

O $\lim_{x\to\infty} \frac{5x}{2-3x^2}$ big $y=0$

K $\lim_{h\to 0} \frac{8(x+h)-8x}{h}$ $\frac{8x+8h-8x}{h}$

C $\lim_{x\to -2} x^3-3x+9$ $-8+6+9$ 7

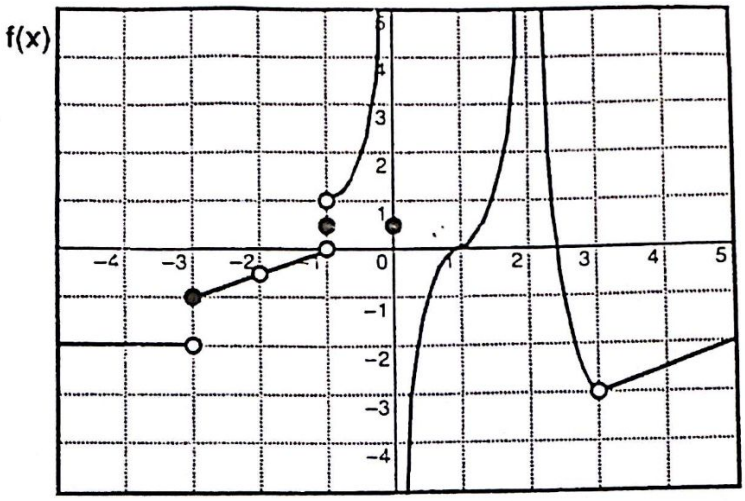
I $\lim_{x\to 5}[x]$ DNE $R\neq L$ 'VE

ANSWERS:

8 MY	4 DON	$\frac{1}{16}$ MONSTER	-1 THAT	$-\frac{1}{16}$ GOT
DNE I (not defined from right)	DNE YOU (not defined from left)	DNE 'VE (rt & left limits not equal	8h AT	0 EMS
-8 BUT	16 ---	6 BL	$\frac{5}{3}$ A	5 THEY
2 WERS	$-\frac{5}{3}$ ME	-2 OWN	75 TH	$-\infty$ 'T
1 ER	$\frac{2}{3}$ BUT	∞ PRO	$-\frac{2}{3}$ ANS	7 BO

Key

WHAT DID THE ASYMPTOTE SAY TO THE REMOVABLE DISCONTINUITY?



Complete the table below for f(x).

a	−3	−2	−1	0	1	2	3
f(a)	1) −1	5) DNE	9) 0.5	13) 0.5	17) 0	21) DNE	25) DNE
$\lim_{x \to a^-} f(x)$	2) −2	6) 0.5	10) 0	14) ∞	18) 0	22) ∞	26) −3
$\lim_{x \to a^+} f(x)$	3) −1	7) 0.5	11) 1	15) −∞	19) 0	23) ∞	27) −3
$\lim_{x \to a} f(x)$	4) DNE	8) 0.5	12) DNE	16) DNE	20) 0	24) ∞	28) −3

29) Give the **right hand limit** as x approaches −5? −2

30) Give the **left hand limit** as x approaches 5? −2

31) For what integer value in the above table is f(x) continuous? 1

32) f(x) has a removable discontinuity (hole) when the x value is 3 and when the x value is (?). −2

33) f(x) is not defined at the vertical asymptote **x** = (?). 2

34) On the open interval (−5, 5), f(x) has (?) discontinuities. 6

A.	−3
D.	0.5
E.	−0.5
H.	0
I.	1
L.	−1
M.	6
N.	−2
R.	2
O.	∞
T.	none
U.	−∞

D	O	N	'	T
9	22	32		4

H	A	N	D
17	27	2	13

T	H	A	T
25	10	28	16

H	O	L	I	E	R
19	23	1	31	6	33

T	H	A	N
5	18	26	29

T	H	O	U
12	20	24	15

L	I	N	E
3	11	30	8

T	O
21	14

M	E
34	7