

# Limits & Continuity

## 1.1A – Limits by Tables

A: Complete the tables and use them to find the given limit. Round to 3 decimal places when appropriate.

#1)  $\lim_{x \rightarrow 3} \frac{6x-7}{x-3} = \text{DNE}$

x	2.9	2.99	2.999	3	3.001	3.01	3.1
y	-104	-1094	-10994	DNE	11006	1106	116

$$\lim_{x \rightarrow 3^-} f(x) = -\infty$$

$$\lim_{x \rightarrow 3^+} f(x) = \infty$$

#2)  $\lim_{x \rightarrow 1} \frac{x^3-1}{x-1} = 3$

x	0.9	0.99	0.999	1	1.001	1.01	1.1
y	2.71	2.9701	2.997	DNE	3.003	3.0301	3.31

$$\lim_{x \rightarrow 1^-} f(x) = 3$$

$$\lim_{x \rightarrow 1^+} f(x) = 3$$

#3)  $\lim_{x \rightarrow 0} \frac{4x+2}{x} = \text{DNE}$

x	-0.1	-0.01	-0.001	0	0.001	0.01	0.1
y	-16	-196	-1996	DNE	2004	204	24

$$\lim_{x \rightarrow 0^-} f(x) = -\infty$$

$$\lim_{x \rightarrow 0^+} f(x) = \infty$$

#4)  $\lim_{x \rightarrow 2} \frac{x^3-8}{x-2} = 12$

x	1.9	1.99	1.999	2	2.001	2.01	2.1
y	11.41	11.94	11.994	DNE	12.006	12.06	12.61

$$\lim_{x \rightarrow 2^-} f(x) = 12$$

$$\lim_{x \rightarrow 2^+} f(x) = 12$$

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B: Find each limit by tables. Round to 3 decimal places when appropriate.

#5)  $\lim_{x \rightarrow 0} (3x + 1)^{\frac{1}{x}} = 20.085$

x	-0.1	-0.01	-0.001	-0.0001	-0.00001	-0.000001	0	0.000001	0.00001	.0001	.001	.01	.1	x
y	35.401	21.029	20.176	20.095	20.086	20.085	DNE	20.085	20.085	20.077	19.996	19.219	13.786	y

$\lim_{x \rightarrow 0^-} f(x) = 20.085$

$\lim_{x \rightarrow 0^+} f(x) = 20.085$

#6)  $\lim_{x \rightarrow 3} \frac{\frac{1}{x} - \frac{1}{3}}{x - 3} = -0.111$

2.9	2.99	2.999	2.9999	3	3.0001	3.001	3.01	3.1
-0.1149	-0.1115	-0.111	-0.111	DNE	-0.111	-0.111	-0.1107	-0.1075

$\lim_{x \rightarrow 3^-} f(x) = -0.111$

$\lim_{x \rightarrow 3^+} f(x) = -0.111$

#7)  $\lim_{x \rightarrow 0} (2 - x)^{\frac{1}{x}} = \text{d.n.e.}$

-0.1	-0.01	-0.001	0	0.001	0.01	0.1
$5.995 \cdot 10^{-4}$	$4.7906 \cdot 10^{-31}$	CALCULATOR SAYS "0" but it's really small	DNE	Too Big to write	$7.679 \cdot 10^{29}$	613.1066

$\lim_{x \rightarrow 0^-} f(x) = 0$

$\lim_{x \rightarrow 0^+} f(x) = \infty$

#8)  $\lim_{x \rightarrow 2} \frac{\sqrt{x} - 2}{x - 2} = \text{dne}$

1.9	1.99	1.999	2	2.001	2.01	2.1
6.216	58.933	586.14	DNE	-585.4	-58.23	-5.509

$\lim_{x \rightarrow 2^-} f(x) = \infty, \text{d.n.e.}$

$\lim_{x \rightarrow 2^+} f(x) = -\infty, \text{d.n.e.}$