5. Show that the function given in equation (8)

$f(x) = \sqrt{x-4}$ continuous on the interval $(4,8)$

at point $x = 4$

$f(x) = \sqrt{x-4}$

$\lim_{x \to 4} \sqrt{x-4} = \sqrt{4-4}$

$= \sqrt{0} = 0$

at point $x = 8$

$\lim \sqrt{x-4} = \sqrt{8-4}$

$= \sqrt{4}$

$= 2$

$f(x) = \sqrt{x-4}$

$= \sqrt{4-4} = \sqrt{0} = 0$

$f(x) = \sqrt{8-4}$

$= \sqrt{4} = 2$

$\lim_{x \to (4,8)} f(x) = f(4,8)$

Hence, $f(x)$ is continuous at $(4,8)$.

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ENG 281 Assignment 1

1 $f(x) = \pi$, find $\lim_{x \to x} f(x)$

$f(x)_{x \to 3} = \pi$, $\lim_{x \to 3} = \pi$

2 $\lim_{x \to 6} f(x)$, $\lim_{x \to 6} (5x - 21)$

f(x)	x − δ	x + δ	f(x)
8.50	5.90	6.10	9.50
8.55	5.91	6.09	9.45
8.60	5.92	6.08	9.40
8.65	5.93	6.07	9.35
8.70	5.94	6.06	9.30
8.75	5.95	6.05	9.25
8.80	5.96	6.04	9.20
8.85	5.97	6.03	9.15
8.90	5.98	6.02	9.10
8.95	5.99	6.01	9.05
9.00	6.0	6.00	9.00

From the table, the left hand and right hand limit all approach 9, we can say: $\lim_{x \to 6} (5x - 21) = 9$

3 Find the limit of the model equation given in equation 3

$$\lim_{x \to 3^+} \frac{3-x}{|3-x|}$$

Sol

$$\lim_{x \to 3^+} \frac{3-x}{|3-x|}$$

$$= \lim_{h \to 0} \frac{3-3+h}{|3-(3+h)|}$$

$$= \frac{3-3-h}{|3-3-h|} = \frac{-h}{|-h|} = \frac{-h}{h} = -1$$

4 Evaluate the limit of the model given the equation (4) if it exists

$$\lim_{x \to 3} \frac{x-3}{|x-3|}$$

$$\text{RHL} \quad \lim_{x \to 3^+} \frac{x-3}{|x-3|} = \lim_{x \to 0} \frac{(3+h)-3}{|(3+h)-3|}$$

$$= \frac{3+h-3}{3+h-3} = \frac{+h}{|+h|} = 1$$

$$\text{LHL} = \lim_{x \to 3^-} \frac{x-3}{|x-3|} = \lim_{x \to 0} \frac{(3-h)-3}{|(3-h)-3|}$$

$$= \frac{3-h-3}{|3-h-3|} = \frac{-h}{|-h|} = \frac{-h}{h} = -1$$

$$\text{Since } \lim_{x \to 3^+} \frac{x-3}{|x-3|} \neq \lim_{x \to 3^-} \frac{x-3}{|x-3|}$$

5. Show that the function given in equation (5)

$f(x) = \sqrt{x-4}$ is continous on the interval (4, 8

at point $x = 4$

$f(x) = \sqrt{x-4}$

$\lim_{x \to 4} \sqrt{x-4} = \sqrt{4-4}$

$= \sqrt{0} = 0$

at point $x = 8$

$\lim \sqrt{x-4} = \sqrt{8-4}$

$= \sqrt{4}$

$= 2$

$F(x) = \sqrt{x-4}$

$= \sqrt{4-4} = \sqrt{0} = 0$

$f(x) = \sqrt{8-4}$

$= \sqrt{4} = 2$

$\lim_{x \to (4, 8)} f(x) = f(4, 8)$

Hence, $f(x)$ is continous at (4, 8)