

$$(4) \lim_{x \rightarrow 3}$$

$$\text{LHS} \\ x = 3 - 0.1 \\ = 2.9$$

$$\text{RHS} \\ x = 3 + 0.1 \\ = 3.1$$

$\rightarrow$  R.H.S

$$\lim_{x \rightarrow 3^+} \frac{3.1 - 3}{|3.1 - 3|} = \frac{0.1}{0.1} = 1$$

L.H.S

$$\lim_{x \rightarrow 3^-} \frac{2.9 - 3}{|2.9 - 3|} = \frac{-0.1}{|-0.1|} = -1 \neq$$

$\therefore$  The limit doesn't exist since LHS  $\neq$  RHS

$$(5) f(x) = \sqrt{x-4} \\ \text{for continuity } [4, 8] \Rightarrow 4, 5, 6, 7, 8 \\ \text{if}$$

$$x = 4 \\ f(x) = \sqrt{4-4} = 0 \neq$$

$$x = 5 \\ f(x) = \sqrt{5-4} = 1 \neq$$

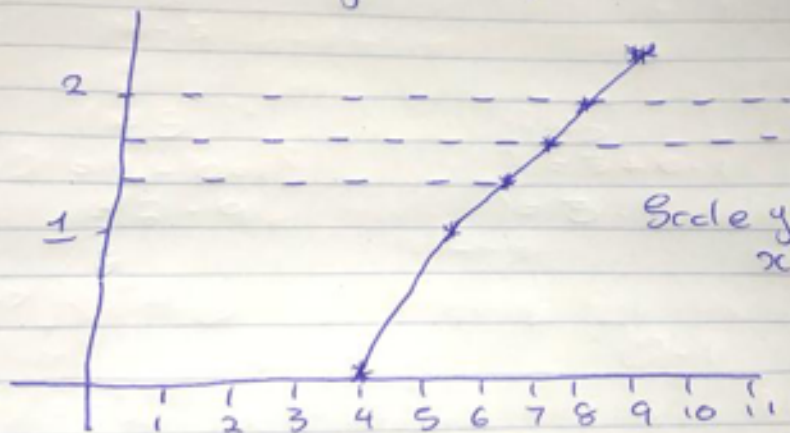
$$x = 6 \\ f(x) = \sqrt{6-4} \\ = 1.4$$

$$x = 7 \\ f(x) = \sqrt{7-4} \\ = 1.7$$

$$x = 8$$

$$f(x) = \sqrt{8-4} = 2$$

# Continuity Graph



Scale y: 2cm = 1 unit  
x: 1cm = 1 unit

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(1)  $f(x) = \frac{1}{x}$   
find the  $\lim_{x \rightarrow 3} f(x)$

Ans: The limit does not exist

2)  $f(x) = 5x - 21$   
 $\delta = 0.1$  and  $\text{step} = 0.01$ ,  $a = 6$

L.H.S

$a - \delta$	$f(x)$
5.9	8.5
5.91	8.55
5.92	8.6
5.93	8.65
5.94	8.7
5.95	8.75
5.96	8.8
5.97	8.85
5.98	8.9
5.99	8.95
$b$	$a$

R.H.S

$a + \delta$	$f(x)$
6.1	9.5
6.09	9.45
6.08	9.4
6.07	9.35
6.06	9.3
6.05	9.25
6.04	9.2
6.03	9.15
6.02	9.1
6.01	9.05
6.00	9

(3) find  $\lim_{x \rightarrow 3} \frac{3-x}{|3-x|}$

R.H.S from  $(x \rightarrow 3^+)$

$$x = 3 + 0.1$$

$$= 3.1$$

$$\lim_{x \rightarrow 3^+} \frac{3 - 3.1}{|3 - 3.1|} = \frac{-0.1}{|-0.1|} = \frac{-0.1}{0.1} = -1$$