$\lim_{x \to c^+}$ ← right

p. 78 as x approaches

Determine the limit

(6) a) $\lim_{x \to c^+} = 2$ ← right $\lim_{x \to c^-} = 0$ ← left $\lim_{x \to c} = DNE$ → average → both sides must match

(4) a) $\lim_{x \to c^+} = 3$ b) $\lim_{x \to c^-} = 3$ c) $\lim_{x \to c} = 3$

(8) $\lim_{x \to 5^-} \frac{-3}{x+5} = \frac{-3}{4.9+5} > \frac{-3}{5+5} = \frac{-3}{10}$

→ 4.9

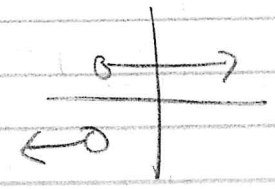
(10) $\lim_{x \to 2^+} \frac{2-x}{x^2-4} = \frac{2-x}{(x+2)(x-2)} = -\frac{1}{x+2} = -\frac{1}{4}$

* subbing in 2 will get 0 in the denom

(12) $\lim_{x \to 9^-} \frac{\sqrt{x}-3}{x-9} = \frac{\sqrt{x}-3}{(\sqrt{x}-3)(\sqrt{x}+3)} = \frac{1}{\sqrt{x}+3} = \frac{1}{\sqrt{9}+3} = \frac{1}{6}$

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

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



(Ex) $\lim_{\Delta x \to 0} \frac{3(x+\Delta x)+2-(3x+2)}{\Delta x}$

$\lim_{\Delta x \to 0} \frac{3x+3\Delta x+2-3x-2}{\Delta x}$

$\lim_{\Delta x \to 0} \frac{3\Delta x}{\Delta x} = 3$

Removable Discontinuity

Non-removable Discontinuity

(18) $\lim_{x\to 2} f(x) = \begin{cases} x^2-4x+6 & x<2 \\ -x^2+4x-2 & x\geq 2 \end{cases}$ so it = 2

$\lim_{x\to 2^+} = -(2)^2+4(2)-2 = 2$ $\lim_{x\to 2^-} = 2^2-4(2)+6 = 2$

(20) $\lim_{x\to 1^+} f(x) = \begin{cases} x & x\leq 1 \\ 1-x & x>1 \end{cases}$ $1-1=0$

Find the x-values the functions discontinuous. Is it removable?

(36) $f(x) = \frac{3}{x-2}$
Disc at $x=2$
Asymptote
Non-remov.

(38) $f(x) = x^2-2x+1$
continuous everywhere

(40) $f(x) = \frac{1}{x^2+1}$
$x^2+1=0$ never
continuous everywhere

(46) $f(x) = \frac{x-6}{x^2-36} = \frac{x-6}{(x+6)(x-6)} = \frac{1}{x+6}$
hole at $x=6$, remov.
Asymptote at $x=-6$
non-remov.

(50) $f(x) = \frac{|x-8|}{x-8}$

Non-removable
disc at $x=8$

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

$\lim_{x\to 1^+} = 1$ $\lim_{x\to 1^-} = 1$
continuous everywhere

(62) calculator

$f(x) = \frac{|x^2+4x|(x+2)}{x+4}$

non-remove $x=-4$