

الفصل السادس

المركبات

تاريخ: ٢٩

أ) $\lim_{x \rightarrow a^+} f(x) = a$

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

ج) $\lim_{x \rightarrow a^+} f(x) = f(a) = a$

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

هـ) $\lim_{x \rightarrow a^+} [f(x)] = a$

و) $\lim_{x \rightarrow a^-} [f(x)] = a$

ز) $\lim_{x \rightarrow a^+} f(x) = a$

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

ط) $\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$

$\lim_{x \rightarrow a^+} \frac{f(x)}{g(x)} = \frac{a}{0^+} = +\infty$
 $\lim_{x \rightarrow a^-} \frac{f(x)}{g(x)} = \frac{a}{0^-} = -\infty$

ي) $\lim_{x \rightarrow a} \frac{f(x)}{(x-a)^2}$

$\lim_{x \rightarrow a^+} \frac{f(x)}{(x-a)^2} = \frac{a}{0^+} = +\infty$
 $\lim_{x \rightarrow a^-} \frac{f(x)}{(x-a)^2} = \frac{a}{0^+} = +\infty$

$$\textcircled{9} \text{ a) } \lim_{x \rightarrow 4} \frac{f(x) - 4}{\sqrt{x} - 4}$$

$$\lim_{x \rightarrow 4^+} \frac{f(x) - 4}{\sqrt{x} - 4} = \frac{9}{\sqrt{0^+}} = +\infty$$

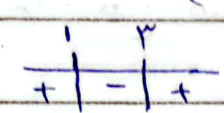
$$\lim_{x \rightarrow 4^-} \frac{f(x) - 4}{\sqrt{x} - 4} = \frac{9}{\sqrt{0^-}} = -\infty$$

o.k.10

$$\textcircled{10} \text{ a) } \lim_{x \rightarrow 2} \frac{f(x) - 4}{\sqrt{x^2 - 4x + 4}}$$

$$\lim_{x \rightarrow 2^+} \frac{f(x) - 4}{\sqrt{x^2 - 4x + 4}} = \frac{9}{\sqrt{(2-1)(2-2)}} = \frac{9}{\sqrt{0^+}} = +\infty$$

$$\lim_{x \rightarrow 2^-} \frac{f(x) - 4}{\sqrt{x^2 - 4x + 4}} = \frac{9}{\sqrt{0^-}} = -\infty$$

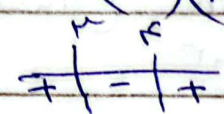


o.k.10

$$\textcircled{11} \text{ a) } \lim_{x \rightarrow 2} \frac{f(x) - 4}{x^2 - \sqrt{x+1}}$$

$$\lim_{x \rightarrow 2^+} \frac{f(x) - 4}{(x-2)(x-1)} = \frac{9}{0^-} = -\infty$$

$$\lim_{x \rightarrow 2^-} \frac{f(x) - 4}{(x-2)(x-1)} = \frac{9}{0^+} = +\infty$$



o.k.10

$$\textcircled{12} \text{ a) } \lim_{x \rightarrow 3} \frac{f(x) - 4}{[x-3]}$$

$$\lim_{x \rightarrow 3^+} \frac{f(x) - 4}{[x-3]} = \frac{9}{0} = +\infty$$

$$\lim_{x \rightarrow 3^-} \frac{f(x) - 4}{[x-3]} = \frac{9}{-1} = -9$$

o.k.10

$$\textcircled{13} \text{ a) } \lim_{x \rightarrow 2} [f(x)] + [-f(x)]$$

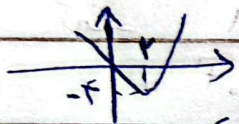
$$\lim_{x \rightarrow 2^+} [f(x)] + [-f(x)] = 9 + (-9) = 0$$

$$\lim_{x \rightarrow 2^-} [f(x)] + [-f(x)] = 1 + (-1) = 0$$

o.k.10

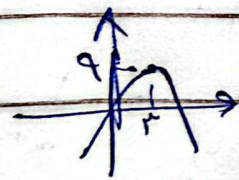
$\lim_{x \rightarrow -4} [-f(x)] + [f(x)] = 2^4 - 1^4 = 11$
 $\lim_{x \rightarrow -4^+} [-f(x)] + [f(x)] = 2^4 - 1^4 = 11$
 $\lim_{x \rightarrow -4^-} [-f(x)] + [f(x)] = 2^4 - 1^4 = 11$

(9) (الف) $\lim_{x \rightarrow 2} [x^2 - f(x)]$
 $\lim_{x \rightarrow 2^+} [x^2 - f(x)] = [2^2]^+ = -2$
 $\lim_{x \rightarrow 2^-} [x^2 - f(x)] = -2$



$x^2 - \epsilon_n \quad \frac{\epsilon}{2} \quad \frac{\epsilon}{2}$
 $\frac{-b}{2a} = \frac{-0}{2 \cdot 1} = 0 = \frac{\epsilon}{2} = 2$

(ب) $\lim_{x \rightarrow 2} [4x - x^2]$
 $\lim_{x \rightarrow 2^+} [4x - x^2] = 1$
 $\lim_{x \rightarrow 2^-} [4x - x^2] = 1$



$-x^2 + 4x$
 $\frac{-b}{2a} = \frac{-4}{-2} = 2$

(10) (الف) $\lim_{x \rightarrow 2} \frac{|x-2|}{x^2 - 3x + 2}$
 $\lim_{x \rightarrow 2^+} \frac{|x-2|}{(x-2)(x-1)} = \frac{1}{(2-1)(2-1)} = 1$
 $\lim_{x \rightarrow 2^-} \frac{|x-2|}{(x-2)(x-1)} = \frac{-1}{(2-1)(2-1)} = -1$

$$\text{Q) } \lim_{x \rightarrow 1} \frac{x - [x]}{x^2 - 1} \xrightarrow{\frac{0}{0}}$$

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

$$\lim_{x \rightarrow 1^-} \frac{x}{x^2 - 1} = \frac{1}{0^-} = -\infty$$

अनंत