

الف) $\lim_{x \rightarrow r^+} f(x) - k$

$f(r) - k = \omega$

ب) $\lim_{x \rightarrow r^-} f(x) - k$

$f(r) - k = \omega$

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الف) $\lim_{x \rightarrow r^+} f[x] - k$
 $x \rightarrow r^+ \Rightarrow [x] = r$

$f(r) - k = \omega$

ب) $\lim_{x \rightarrow r^-} f[x] - k$
 $x \rightarrow r^- \Rightarrow [x] = r$

$f(r) - k = \omega$

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الف) $\lim_{x \rightarrow r^+} [f(x) - k]$

$[f(r) - k] = [\omega^+] = \omega$

ب) $\lim_{x \rightarrow r^-} [f(x) - k]$

$[f(r) - k] = [\omega^-] = \omega$

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الف) $[\lim_{x \rightarrow r^+} f(x) - k] = [\omega] = \omega$

ب) $[\lim_{x \rightarrow r^-} f(x) - k] = [\omega] = \omega$

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الف) $\lim_{x \rightarrow k} \frac{f(x) - k}{x - k}$

$x \rightarrow k^+ \quad \frac{0}{0^+} = +\infty$
 $x \rightarrow k^- \quad \frac{0}{0^-} = -\infty$
→ $\frac{0}{0}$

ب) $\lim_{x \rightarrow k} \frac{f(x) - k}{(x - k)^+}$

$x \rightarrow k^+ \quad \frac{0}{(0^+)^+} = +\infty$
 $x \rightarrow k^- \quad \frac{0}{(0^-)^+} = +\infty$
→ $+\infty$

$$\text{ii) } \lim_{x \rightarrow \mu} \frac{f(x) - \mu}{\sqrt{x - \mu}}$$

$$x \rightarrow \mu^+ \quad \frac{a}{0^+} = +\infty \quad \text{L'Hôpital}$$

$$x \rightarrow \mu^- \quad \frac{a}{\sqrt{0^-}} \rightarrow \text{ÜÜ}$$

$$\text{ii) } \lim_{x \rightarrow \mu} \frac{f(x) - \mu}{\sqrt{x^2 - f(x) + \mu}}$$

$$x \rightarrow \mu^+ \quad \frac{a}{\sqrt{(x-\mu)(x-1)}} = \frac{a}{\sqrt{0^+ \cdot x - 1}} = +\infty$$

$$x \rightarrow \mu^- \quad \frac{a}{\sqrt{(x-\mu)(x-1)}} = \frac{a}{\sqrt{0^- \cdot x - 1}} = \text{ÜÜ}$$

$$\text{ii) } \lim_{x \rightarrow \mu} \frac{f(x) - \mu}{x^2 - \sqrt{x+1}}$$

$$x \rightarrow \mu^+ \quad \frac{a}{(x-1)(x-\mu)} = \frac{a}{-1 \cdot 0^+} = -\infty \quad \text{L'Hôpital}$$

$$x \rightarrow \mu^- \quad \frac{a}{(x-1)(x-\mu)} = \frac{a}{-1 \cdot 0^-} = +\infty$$

$$\text{ii) } \lim_{x \rightarrow \mu} \frac{f(x) - \mu}{[x - \mu]}$$

$$x \rightarrow \mu^+ \quad \frac{a}{[0^+]} = \frac{a}{0} = \text{ÜÜ}$$

$$x \rightarrow \mu^- \quad \frac{a}{[0^-]} = -\frac{a}{0} = -\infty$$

$$\text{ii) } \lim_{x \rightarrow \mu} [x^+] + [-x^-]$$

$$x \rightarrow \mu^+ \quad [a^+] + [-b^-] = a - b = r$$

$$x \rightarrow \mu^- \quad [a^-] + [-b^+] = a - b = r$$

0 + r

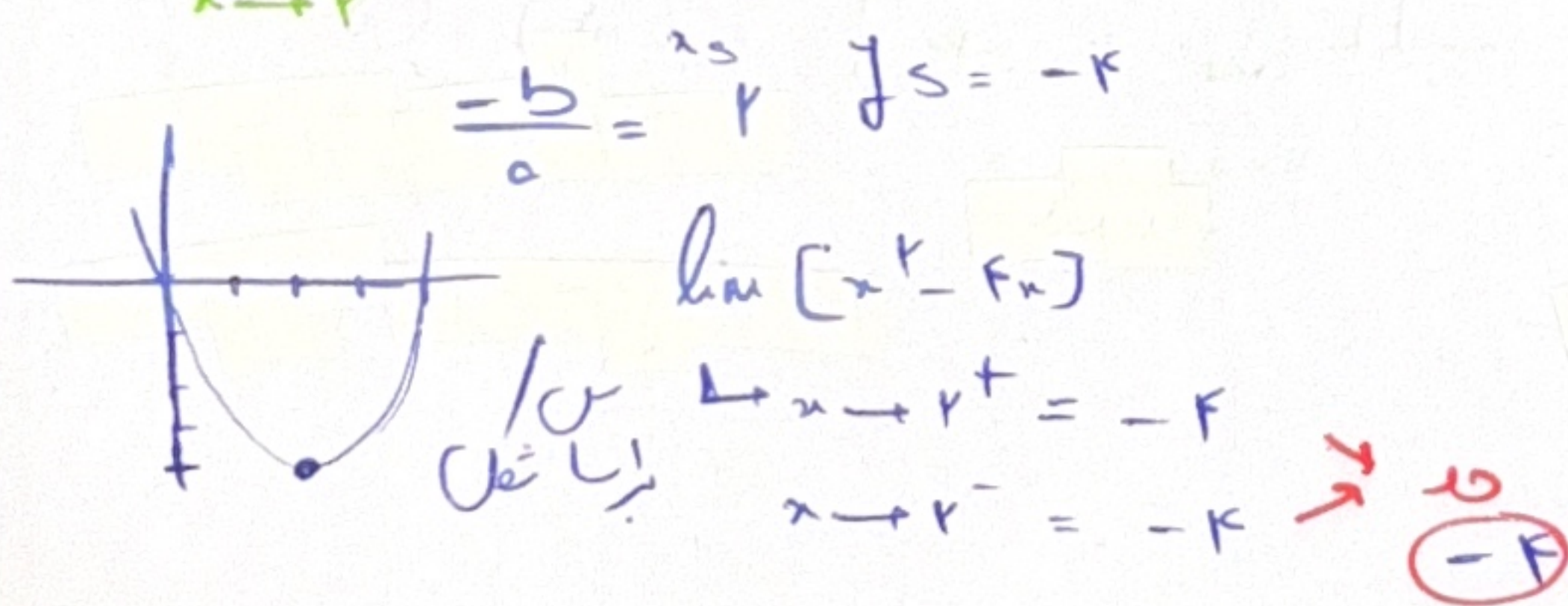
$$\text{ii) } \lim_{x \rightarrow -\mu} [-f(x)] + [r_2]$$

$$x \rightarrow -\mu^+ \quad [r_1^-] + [-r_2^+] = r_1 - r_2 = r$$

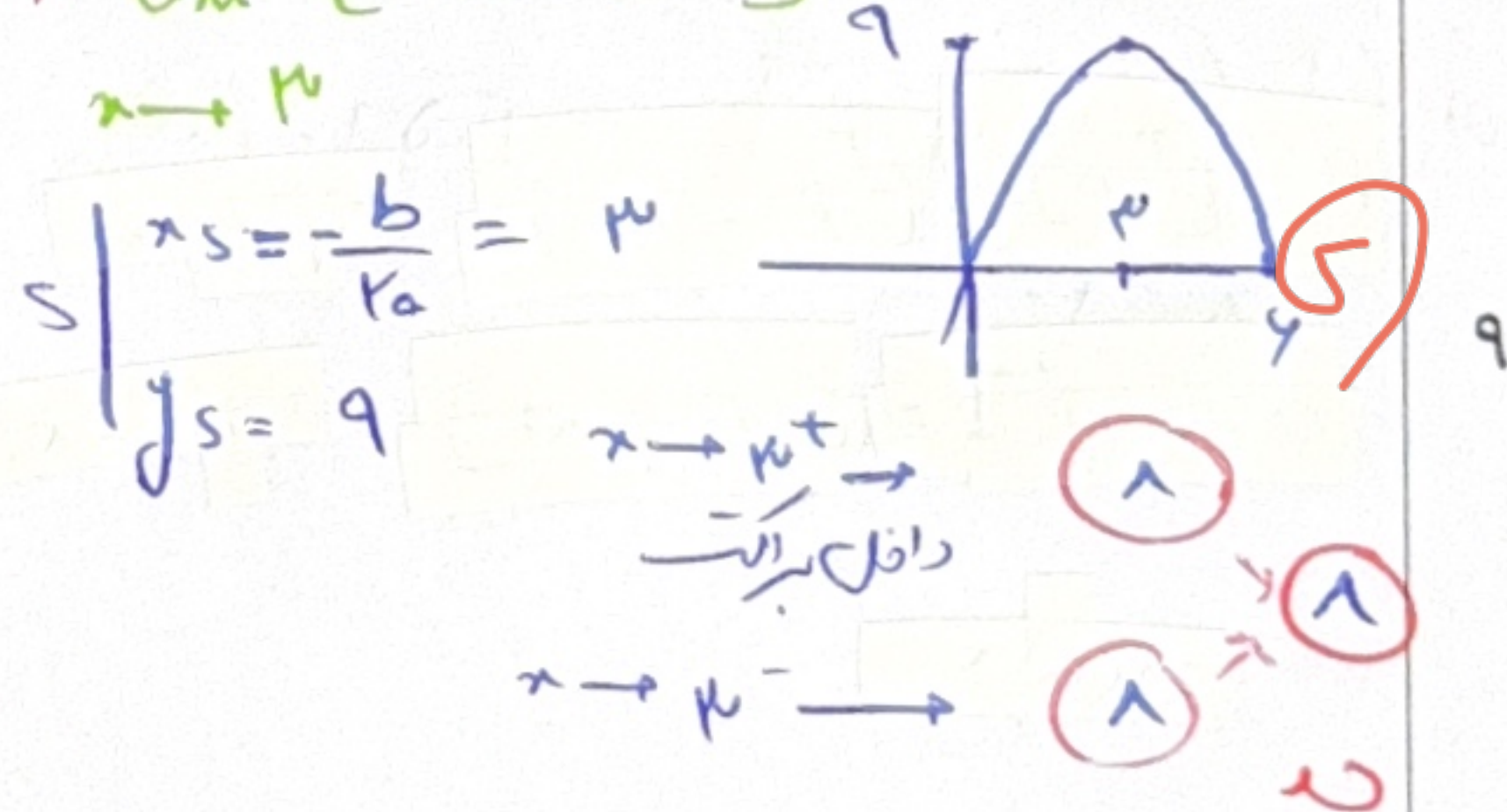
$$x \rightarrow -\mu^- \quad [r_1^+] + [-r_2^-] = r_1 - r_2 = r$$

0 - r

$$\text{ii) } \lim_{x \rightarrow r} [x^r - f(x)]$$



$$\text{ii) } \lim_{x \rightarrow \mu} [4x - x^2]$$



$$\text{ii) } \lim_{x \rightarrow r} \frac{|x-r|}{x^2 - \mu x + r} \quad \text{if } x=r \div$$

$$x \rightarrow r^+ \quad \frac{|x-r|}{(x-r)(x-1)} = \frac{x-r}{(x-r)(x-1)} = \frac{1}{x-1} = \frac{1}{r-1} = 1$$

$$x \rightarrow r^- \quad \frac{|x-r|}{(x-r)(x-1)} = \frac{-1}{(x-r)(x-1)} = \frac{-1}{r-1} = -1$$

L'Hôpital

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

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

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

L'Hôpital