

تکلیف ۱۹

دوازدهم A صبح

مریم توکلی

(سوال ۱)

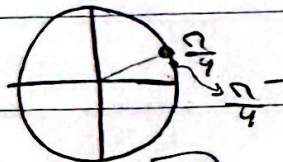
$$f(x) = x \left[\frac{x-a}{x} \right] + a \left[\frac{x+a}{x} \right]$$

$$x = -x^+ \rightarrow x \left[\frac{x}{x} \right] + a \left[\frac{0^+}{x} \right] \rightarrow x$$

$$x = -x^- \rightarrow x \left[\frac{x}{x} \right] + a \left[\frac{0^-}{x} \right] \rightarrow x - a$$

$$x = x - a \rightarrow \underline{a = x} \quad \left[\frac{a}{x} \right] = \left[\frac{x}{x} \right] = \boxed{1} \quad \checkmark$$

$$\lim_{x \rightarrow \left(\frac{\pi}{4}\right)^-} [x \sin x - 1]$$



$$\left[x \left(\frac{1}{x} \right) - 1 \right] \rightarrow [1 - 1] = [0] = \boxed{-1} \quad \checkmark$$

$$\lim_{x \rightarrow -\frac{1}{x}} [\lambda x^x - x]$$

$$\rightarrow \left[\lambda \left(-\frac{1}{\lambda} \right) - \left(-\frac{1}{\lambda} \right) \right] = \left[-1 + \frac{1}{\lambda} \right] = \left[-\frac{1}{\lambda} \right] = \boxed{-1} \quad \checkmark$$

* چون داخل برکت عدد صحیح نداریم، نیاز به دو طرفه داریم!

(سوال ۲)

$$\lim_{x \rightarrow \left(-\frac{1}{x}\right)^-} \frac{10x - 5 + \left[\frac{x}{x^2} \right]}{14x - \left[-\frac{x}{x^2} \right]} \rightarrow \left[\frac{x}{x^2} \right] = [x] = 11$$

$$\rightarrow \left[-\frac{x}{x^2} \right] = [-x] = -11$$

$$x < -\frac{1}{x} \rightarrow \frac{1}{x} > -x \rightarrow \frac{1}{x^2} < x \rightarrow \frac{x}{x^2} < 1 \rightarrow \frac{x}{x^2} = 1^-$$

$$\frac{1}{x^2} < x \rightarrow -\frac{1}{x^2} > -x \rightarrow \frac{-x}{x^2} > -1 \rightarrow \frac{-x}{x^2} = -1^+$$

$$\frac{-5 - 5 + 11}{-11 + 11} = \frac{1}{0^-} = \boxed{-\infty} \quad \checkmark$$

آپادانا

$$\lim_{n \rightarrow 1^+} \frac{\sin^2 n}{[\sin] + \cos n} \xrightarrow{\frac{0}{0}} \frac{\sin^2 n}{1 + \cos n} \quad \text{(سوال ۲)}$$

$$\rightarrow \frac{1 - \cos^2 n}{1 + \cos n} \rightarrow \frac{(1 - \cos n)(1 + \cos n)}{1 + \cos n} = 1 - \cos n$$

$$n=1 \rightarrow 1 - \cos 1 \rightarrow 1 - (-1) = \boxed{2} \quad \checkmark$$

$$\lim_{n \rightarrow -1} \frac{\sqrt{n+2} - \sqrt{n+1}}{1 + \sqrt{n}} \xrightarrow{\frac{0}{0}} \text{نوع اولی از لیمیت} \quad \text{(سوال ۲)}$$

$$\frac{\sqrt{n+2} - \sqrt{n+1}}{1 + \sqrt{n}} \times \frac{\sqrt{n+2} + \sqrt{n+1}}{\sqrt{n+2} + \sqrt{n+1}} \times \frac{(1 + \sqrt{n} - \sqrt{n})}{(1 + \sqrt{n} - \sqrt{n})}$$

$$\Rightarrow \frac{(n+2 - n-1) \times \sqrt{n}}{2(1+n)} = \frac{1 \times \sqrt{n}}{2(n+1)} \rightarrow \boxed{\frac{\sqrt{n}}{2(n+1)}} \quad \checkmark$$

$$\lim_{n \rightarrow 1} \frac{n - \sqrt{n+1}}{n - \sqrt{n+1}} \rightarrow \frac{(\sqrt{n}-1)(\sqrt{n}+1)}{n - \sqrt{n+1}} \xrightarrow{\frac{0}{0}} \text{نوع اولی از لیمیت} \quad \text{(سوال ۲)}$$

$$\rightarrow \frac{(\sqrt{n}-1)(\sqrt{n}+1) \times \sqrt{n+1}}{n - \sqrt{n+1}} = \frac{(\sqrt{n}-1)(\sqrt{n}+1) \times \epsilon}{\epsilon n^2 - n - 1}$$

$$\Rightarrow \frac{(\sqrt{n}-1)(\sqrt{n}+1) \times \epsilon}{(n-1)(n+1)} \Rightarrow \frac{(\sqrt{n}-1)(\sqrt{n}+1) \times \epsilon}{(\sqrt{n}-1)(\sqrt{n}+1)(n+1)}$$

$$n=1 \rightarrow \frac{-1 \times \epsilon}{1 \times 2} = \boxed{-\frac{\epsilon}{2}} \quad \checkmark$$

پایان

Subject:

Year:

Month:

Date:

(سوال ۸)

$$\lim_{n \rightarrow 0} \frac{a + \sqrt{bn+c}}{n} = \frac{1}{\varepsilon} \quad \frac{ab}{c} = ?$$

این هوسیتال (سوال ۸) $\rightarrow \frac{b}{\sqrt{bn+c}} = \frac{b}{\sqrt{bn+c}} \xrightarrow{n=0} \frac{b}{\sqrt{c}} = \frac{1}{\sqrt{c}}$

$$\Rightarrow \sqrt{b} = \sqrt{c}$$

تبدیل از هوسیتال $\rightarrow \frac{a + \sqrt{c}}{0} = \frac{1}{\varepsilon} \leadsto a + \sqrt{c} = 0 \rightarrow -\sqrt{c} = a$

$$\rightarrow \frac{ab}{c} = \frac{-\sqrt{c} \times \sqrt{c}}{c} = \frac{-c}{c} = \boxed{-1}$$

$$\lim_{n \rightarrow -\infty} \frac{\varepsilon + k\left[\frac{n}{n}\right]}{\sin n} = +\infty$$

(سوال ۹)

$$n = -n^+ \rightarrow \frac{\varepsilon + k\left[\frac{-n^+}{n}\right]}{\sin(-n^+)} = \frac{\varepsilon - k}{0^+} = +\infty \Rightarrow \varepsilon - k > 0$$

$$\Rightarrow k < \varepsilon \rightarrow \underline{k < \varepsilon}$$

$$n = -n^- \rightarrow \frac{\varepsilon + k\left[\frac{-n^-}{n}\right]}{\sin(-n^-)} = \frac{\varepsilon - k}{0^-} = +\infty \Rightarrow \varepsilon - k < 0$$

$$\Rightarrow k > \varepsilon \rightarrow k > \frac{\varepsilon}{\rho}$$

$$\Rightarrow \frac{\varepsilon}{\rho} < k < \varepsilon \rightarrow \boxed{[-k]} = \boxed{[-\varepsilon]}$$

آپادانا

$$\lim_{n \rightarrow \infty} \frac{b \sqrt{r + \sqrt[n]{n}} - rb}{an - b}$$

سوال ۱۰

$$\xrightarrow{n \rightarrow \infty} \frac{rb - rb}{\infty a - b} = \frac{0}{0} \rightarrow \infty a - b = 0 \rightarrow \infty a = b$$

(۴)

! $\frac{0}{0}$ $\rightarrow$ $b \times \frac{1}{r \sqrt[n]{n}}$

$$\frac{r \sqrt{r + \sqrt[n]{n}}}{a} = b \times \frac{1}{\frac{1}{r}} \Rightarrow \frac{b}{a} \times \frac{1}{\epsilon n}$$

$$\rightarrow \boxed{\frac{1}{4}} \quad \checkmark$$