

کتاب (مسابقات) / دوازدهم دختره A

بنا سزا

تاریخ ۱۹

$$\lim_{x \rightarrow 2} x \left[\frac{x-2}{x} \right] + a \left[\frac{x+2}{x} \right]$$

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

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

$$x = a = 2 \rightarrow a = 2 \rightarrow \left[\frac{0}{x} \right] = \left[\frac{x}{x} \right] = 1 \rightarrow 2$$

$$\lim_{x \rightarrow \left(\frac{\pi}{2}\right)^-} [x \sin x - 1] \rightarrow \left[x \sin \left(\frac{\pi}{2}\right)^- - 1 \right] =$$

$$\left[x \times \left(\frac{1}{x}\right)^- - 1 \right] = \left[1^- - 1 \right] = \left[0^- \right] = -1 \xrightarrow{\lim} (-1) \rightarrow 2$$

$$\lim_{x \rightarrow -\frac{1}{x}} [1/x^2 - x] \rightarrow y = 1/x^2 - x \text{ مشتق } y' = 2/x^3 - 1$$

x	$-\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$
y'	+	-
y	↗	↘

$\rightarrow x = \frac{1}{x} \rightarrow \left(-\frac{1}{\sqrt{2}}, \frac{1}{\sqrt{2}} \right)$ در بازه بین

$$x = -\frac{1}{x} \rightarrow \left(1/x^2 - 1/x \right) = -\frac{1}{x} \rightarrow -\frac{1}{x} \rightarrow \left[\frac{1}{x} \right] = -1 \rightarrow \left[\frac{1}{x} \right] = 1$$

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SUBJECT

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$$1. \lim_{x \rightarrow \left(\frac{1}{e}\right)^-} \frac{\log x - \Delta + \left[\frac{x}{x^2}\right]}{17x - \left[-\frac{x}{x^2}\right]}$$

$$\Rightarrow x = -\frac{1}{e} \rightarrow \frac{x}{x^2} = 1 \rightarrow \frac{x}{x^2} = -\frac{1}{e} \rightarrow \left[\frac{x}{x^2}\right] = [1^-] = 1$$

$$\textcircled{II} = -\frac{a}{x^2} \Rightarrow x = -\frac{1}{e} \rightarrow \frac{x}{x^2} = -1 \rightarrow x = -1$$

$$\Rightarrow x = -\frac{1}{e} \rightarrow \left[\frac{x}{x^2}\right] = [-1^+] = -1$$

$$\Rightarrow \frac{\log x - \Delta + 11}{17x - (-1)} = \frac{\log x + 7}{17x + 1} \quad x = -\frac{1}{e} \rightarrow \frac{-\Delta + 7}{0} = -\infty \Rightarrow 2.$$

لم نأخذ في الحسبان أن $x = -\frac{1}{e}$ هو عدد حقيقي

$$7. \lim_{x \rightarrow 1^+} \frac{\sin^2 x}{[x] + \cos x} \Rightarrow \frac{\sin^2 x}{[1^+] + \cos x} = \frac{\sin^2 x}{1 + \cos x}$$

$$9. x = 0 \rightarrow \frac{0}{1-1} = \frac{0}{0} \rightarrow \text{نستخدم قاعدة لوبيتال}$$

$$10. \sin^2 x = 1 - \cos^2 x \rightarrow \frac{1 - \cos^2 x}{1 + \cos x} = \frac{(1 - \cos x)(1 + \cos x)}{1 + \cos x}$$

$$11. 1 - \cos x \rightarrow x = 1 \rightarrow 1 - (-1) = 2$$

$$12. \lim_{x \rightarrow -1} \frac{\sqrt{2x-5} - \sqrt{4x+3}}{1 + \sqrt{x}} = \frac{0}{0} \rightarrow \text{نستخدم قاعدة لوبيتال}$$

$$14. \frac{\sqrt{2x-5} - \sqrt{4x+3}}{1 + \sqrt{x}} \times \frac{\sqrt{2x-5} + \sqrt{4x+3}}{\sqrt{2x-5} + \sqrt{4x+3}} \rightarrow \frac{(2x-5) - (4x+3)}{(1 + \sqrt{x})(\sqrt{2x-5} + \sqrt{4x+3})}$$

$$16. \frac{1+1+1}{1+1} = \frac{3}{2} \Rightarrow \frac{(-x-1)}{1+x} \times \frac{x}{x} = -1 \times \frac{x}{x} = -1$$

$$17. \lim_{x \rightarrow 1} \frac{x - \sqrt{x+1}}{x - \sqrt{4x+1}} = \frac{0}{0} \rightarrow \text{نستخدم قاعدة لوبيتال}$$

$$19. \text{h.o.p} \rightarrow \frac{x - \left(\frac{x}{x} \times \frac{1}{\sqrt{x}}\right)}{x - \frac{x}{2}} \quad x=1 \rightarrow \frac{1 - \left(\frac{1}{1} \times 1\right)}{1 - \frac{1}{2}} = \frac{-\frac{1}{2}}{\frac{1}{2}} = -1$$

$$\lim_{x \rightarrow 0} \frac{a + \sqrt{bx+c}}{x} = \frac{1}{2} \rightarrow \frac{a + \sqrt{c}}{0} = \frac{1}{2} \rightarrow \text{برای جواب این باید صورت و مخرج هم صفر شود} \quad (1)$$

$$\frac{a + \sqrt{c}}{0} = \frac{0}{0} \rightarrow a = -\sqrt{c} \rightarrow \text{حالا چون 2 می داریم باید این را هم از این جا حذف کنیم}$$

$$\frac{a + \sqrt{bx+c}}{x} \times \frac{a - \sqrt{bx+c}}{a - \sqrt{bx+c}} = \frac{a^2 - bx - c}{x(a - \sqrt{bx+c})} \quad \frac{a - \sqrt{c}}{a - \sqrt{c}} = 1$$

$$\frac{-bx}{x(a - \sqrt{bx+c})} = \frac{-b}{a - \sqrt{bx+c}} \quad x=0, \quad \frac{-b}{a - \sqrt{c}} = \frac{-b}{2a} = \frac{1}{2}$$

$$\rightarrow -\varepsilon b = 2a \rightarrow a = -\frac{1}{2}b \rightarrow b = -\frac{1}{2}a, \quad c = a^2$$

$$\rightarrow \frac{a \times b}{c} = \frac{a \times -\frac{1}{2}a}{a^2} = \left(-\frac{1}{2}\right) \rightarrow 2$$

$$\lim_{x \rightarrow \infty} \frac{\varepsilon + K \left[\frac{x}{x} \right]}{\varepsilon \ln x} = +\infty \quad \xrightarrow{x \rightarrow \infty} \frac{\varepsilon + K}{\varepsilon} = +\infty \quad (2)$$

$$\xrightarrow{x \rightarrow \infty} \frac{\varepsilon - K}{\varepsilon} = +\infty$$

$$\textcircled{I} \quad \varepsilon - K > 0 \rightarrow \varepsilon > K \rightarrow K \in \left(\frac{\varepsilon}{2}, \frac{\varepsilon}{K} \right)$$

$$\textcircled{II} \quad \varepsilon - K < 0 \rightarrow \varepsilon < K \rightarrow \frac{\varepsilon}{K} < K$$

$$\rightarrow [K] \xrightarrow{\text{مقدار}} \left[-\frac{\varepsilon}{K} \right] = \left(-\frac{\varepsilon}{K} \right) \rightarrow 2$$

$$\lim_{x \rightarrow 1} \frac{b\sqrt{x+1} - 2b}{\frac{1}{x} - 1} = \frac{0}{0} \rightarrow \text{چون صورت و مخرج هم صفر شود باید عامل مشترک را حذف کنیم} \quad (3)$$

$$\lim_{x \rightarrow 1} \frac{b\sqrt{x+1} - 2b}{\frac{1}{x} - 1} = \frac{0}{0} \rightarrow \text{حالا چون 2 داریم باید این را هم از این جا حذف کنیم}$$

$$\rightarrow \frac{b(\sqrt{x+1} - 2)}{\frac{1}{x} - 1} = \frac{\sqrt{x+1} - 2}{\frac{1}{x} - 1} \times \frac{\sqrt{x+1} + 2}{\sqrt{x+1} + 2} = \frac{x\sqrt{x+1} - 2}{\frac{1}{x} - 1} \times \frac{\sqrt{x+1} + 2}{\sqrt{x+1} + 2}$$

$$\rightarrow \frac{x(\sqrt{x+1} - 2)}{\frac{1}{x} - 1} \times \frac{\sqrt{x+1} + 2}{\sqrt{x+1} + 2} = \frac{x(x-1)}{\frac{1}{x} - 1} \times \frac{\sqrt{x+1} + 2}{\sqrt{x+1} + 2} = \frac{x(x-1)}{1(x-1)} \times \frac{\sqrt{x+1} + 2}{\sqrt{x+1} + 2}$$

$$\rightarrow \lim_{x \rightarrow 1} \frac{x}{x} \times \frac{1}{\varepsilon x \varepsilon^2} = \left(\frac{1}{\varepsilon^2} \right) \rightarrow 2$$