

Prezime, ime, br. indeksa: _____

U svakom zadatku u kom je dato više odgovora treba zaokružiti tačne odgovore tj. slova ili brojeve ispred tačnih odgovora. U jednom istom zadatku broj tačnih odgovora može biti 0,1,2,3,...svi. U nekim zadacima ostavljena su prazna mesta za upisivanje odgovora.

- Ako je $\lim_{x \rightarrow x_0} f(x) = a$, $\lim_{x \rightarrow x_0} g(x) = b$, $g(x) \neq 0$, $b \neq 0$, $\alpha, \beta, c \in \mathbb{R}$, tada je:

1) $\lim_{x \rightarrow x_0} \frac{f(x)}{g(x)} = \frac{b}{a}$ 2) $\lim_{x \rightarrow x_0} (\alpha f(x) - \beta g(x)) = \alpha a - \beta b$ 3) $\lim_{x \rightarrow x_0} (f(x) \cdot g(x)) = \lim_{x \rightarrow x_0} f(x) + \lim_{x \rightarrow x_0} g(x)$

4) $\lim_{x \rightarrow x_0} (f(x) + g(x)) = \lim_{x \rightarrow x_0} g(x) + \lim_{x \rightarrow x_0} f(x)$ 5) $\lim_{x \rightarrow x_0} \frac{f(x)}{g(x)} = \frac{a}{b}$ 6) $\lim_{x \rightarrow x_0} (c \cdot g(x)) = c \lim_{x \rightarrow x_0} f(x)$

7) $\lim_{x \rightarrow x_0} (f(x) \cdot g(x)) = \lim_{x \rightarrow x_0} f(x) \cdot \lim_{x \rightarrow x_0} g(x)$ 8) $\lim_{x \rightarrow x_0} (c \cdot f(x)) = c \cdot a$ 9) $\lim_{x \rightarrow x_0} (c \cdot f(x))^2 = c \lim_{x \rightarrow x_0} (f(x))^2$

10) $\lim_{x \rightarrow x_0} (\alpha f(x) + \beta g(x)) = \beta \lim_{x \rightarrow x_0} f(x) + \alpha \lim_{x \rightarrow x_0} g(x)$

- Zaokružiti tačne izraze:

1) $\lim_{x \rightarrow \infty} q^x = 1$, za $q = 1$ 2) $\lim_{x \rightarrow \infty} q^x = +\infty$, za $q = 3$ 3) $\lim_{x \rightarrow 0} \frac{\sin x}{x} = 0$ 4) $\lim_{x \rightarrow 0} (1+x)^{\frac{1}{x}} = 1$

5) $\lim_{x \rightarrow \infty} q^x = +\infty$, za $q > 1$ 6) $\lim_{x \rightarrow \infty} q^x = 0$, za $|q| < 1$ 7) $\lim_{x \rightarrow \infty} (1 + \frac{1}{x})^x = e$ 8) $\lim_{x \rightarrow \infty} q^x = 0$, za $|q| \leq 1$

9) $\lim_{x \rightarrow 0} (1+x)^x = e$ 10) $\lim_{x \rightarrow 0} \frac{x}{\sin x} = 1$ 11) $\lim_{x \rightarrow \infty} \frac{P(x)}{Q(x)} = 0$, $\deg(P) < \deg(Q)$

12) $\lim_{x \rightarrow \infty} \frac{P(x)}{Q(x)} = 0$, $\deg(P) = \deg(Q)$ 13) $\lim_{x \rightarrow \infty} \frac{P(x)}{Q(x)} = 0$, $\deg(P) > \deg(Q)$

- Zaokruži brojeve ispred neodređenih izraza:

1) " $\infty - \infty$ " 2) " $\infty \cdot \infty$ " 3) " $\frac{\infty}{0}$ " 4) " $\frac{0}{-\infty}$ " 5) " 0^∞ " 6) " $\frac{1}{0}$ " 7) " 1^∞ " 8) " $\frac{0}{0}$ " 9) " ∞^0 " 10) " $\infty \cdot 0$ "

11) " $\frac{\infty}{\infty}$ " 12) " 0^0 " 13) " $\infty + \infty$ " 14) " 3^∞ " 15) " $\frac{1}{0}$ " 16) " $\frac{e}{\infty}$ " 17) " e^∞ " 18) " $\ln 0$ " 19) " $0 \cdot \infty$ "

20) " ∞^∞ " 21) " $\frac{\infty}{0}$ " 22) " $\ln \infty$ " 23) " $\lg \frac{\pi}{2}$ "

- Zaokruži brojeve ispred određenih izraza i napisati njihovu vrednost:

1) " 1^∞ " = / 2) " $\frac{0}{0}$ " = / 3) " $\infty - \infty$ " = / 4) " $7^{-\infty}$ " = $\frac{1}{7^\infty} = 0$ 5) " $\frac{\infty}{\infty}$ " = /

6) " $\frac{1}{\infty}$ " = 0 7) " $\frac{0}{\infty}$ " = 0 8) " $\ln 0$ " = $-\infty$ 9) " $3^{-\infty}$ " = 0 10) " $\ln 1$ " = 0

11) " 0^0 " = / 12) " $0 \cdot \infty$ " = / 13) " $\ln \infty$ " = ∞ 14) " 2^∞ " = ∞ 15) " 0^∞ " = 0

16) " ∞^0 " = / 17) " $\ln e$ " = 1 18) " $\infty + \infty$ " = ∞ 19) " $\frac{1}{0}$ " = ∞ 20) " $\infty \cdot \infty$ " = ∞

21) " ∞^∞ " = ∞ 22) " $\frac{\infty}{0}$ " = ∞ 23) " $\arctg(+\infty)$ " = $\frac{\pi}{2}$ 24) " $\arctg(-\infty)$ " = $-\frac{\pi}{2}$

- Izračunati:

1) $\lim_{x \rightarrow 3} (1 + \frac{1}{x})^x = (\frac{4}{3})^3$ 2) $\lim_{x \rightarrow 0} (1+x)^{\frac{1}{x}} = e$ 3) $\lim_{x \rightarrow \infty} (1 + \frac{1}{x})^x = e$

4) $\lim_{x \rightarrow e} (1+x)^x = (1+e)^e$ 5) $\lim_{x \rightarrow \infty} (\frac{x^2+3}{x^2-2})^{2x^2} = e^{10}$ 6) $\lim_{x \rightarrow \infty} (1+x)^{\frac{1}{x}} = 1$

7) $\lim_{x \rightarrow \frac{\pi}{4}} \frac{\sin x}{x} = \frac{\frac{\sqrt{2}}{2}}{\frac{\pi}{4}} = \frac{2\sqrt{2}}{\pi}$ 8) $\lim_{x \rightarrow \infty} (\frac{3}{7})^x = 0$ 9) $\lim_{x \rightarrow \infty} (\frac{1}{3})^x = \infty$

10) $\lim_{x \rightarrow 0} (x)^{\frac{1}{x}} = 0^\infty = 0$ 11) $\lim_{x \rightarrow \infty} \frac{3x^3+x-2}{2x^3-2} = \frac{3}{2}$ 12) $\lim_{x \rightarrow \infty} 2^{-x} = 0$

13) $\lim_{x \rightarrow 2} \frac{x^2-4}{x-2} = \lim_{x \rightarrow 2} \frac{(x-2)(x+2)}{x-2} = 4$ 14) $\lim_{x \rightarrow 2} \frac{4-x^2}{x-2} = \lim_{x \rightarrow 2} \frac{(2-x)(2+x)}{x-2} = -4$ 15) $\lim_{x \rightarrow \infty} 1^x = 1^\infty = 1$

5) $\lim_{x \rightarrow \infty} (\frac{x^2+3}{x^2-2})^{2x^2} = \lim_{x \rightarrow \infty} (1 + \frac{5}{x^2-2})^{2x^2} = e^{\lim_{x \rightarrow \infty} \frac{10x^2}{x^2-2}} = e^{10}$

6*) $(1+x)^{\frac{1}{x}} = A / \ln$
 $\ln A = \frac{1}{x} \ln(1+x)$
 $\lim_{x \rightarrow \infty} \ln A = \lim_{x \rightarrow \infty} \frac{\ln(1+x)}{x} \stackrel{0}{=} \lim_{x \rightarrow \infty} \frac{1}{1+x} = 0 \stackrel{0}{=} \lim_{x \rightarrow \infty} A = 1$

• Izračunati:

$$1) \lim_{x \rightarrow \infty} \frac{x^7 - 2x^2 + 3}{2x^3 + 2x^2 - x} = \infty$$

$$3) \lim_{x \rightarrow \infty} \frac{-3x^3 - 2x^2 + 1}{5x^3 - x^2 + 2} = -\frac{3}{5}$$

$$5) \lim_{x \rightarrow \infty} \frac{x^4}{\ln 3x} = \infty$$

$$7) \lim_{x \rightarrow 0} \frac{\sin 5x}{\sin 2x} = \lim_{x \rightarrow 0} \frac{\sin 5x \cdot 5x}{\sin 2x \cdot 2x} = \frac{5}{2}$$

$$9) \lim_{x \rightarrow 0} \frac{\ln(5x+1)}{x} = \lim_{x \rightarrow 0} \frac{\frac{1}{5x+1} \cdot 5}{1} = \lim_{x \rightarrow 0} \frac{5}{5x+1} = 5$$

$$10) \lim_{x \rightarrow \infty} \left(\frac{2x^2 + 5}{x^2 - 3} \right)^{\frac{x^2}{x-1}} = 2^\infty$$

$$11) \lim_{x \rightarrow 1} \left(\frac{x^3 + 2x + 3}{x^3 + 3} \right)^{\frac{-2x^2}{x+3}} = \left(\frac{6}{4} \right)^{-\frac{2}{4}} = \left(\frac{3}{2} \right)^{-\frac{1}{2}} = \left(\frac{2}{3} \right)^{\frac{1}{2}} = \sqrt{\frac{2}{3}}$$

$$12) \lim_{x \rightarrow \infty} \left(\frac{x^2 + 5}{x^2 - 3} \right)^{\frac{x^2}{x-1}} = \lim_{x \rightarrow \infty} \left(1 + \frac{8}{x^2 - 3} \right)^{\frac{x^2}{x-1}} = e^{\lim_{x \rightarrow \infty} \frac{8x^2}{(x^2-3)(x-1)}} = e^0 = 1$$

$$13) \lim_{x \rightarrow 0} \frac{\sqrt{x+4} - 2}{\sin 3x} = \lim_{x \rightarrow 0} \frac{\sqrt{x+4} - 2}{\sin 3x} \cdot \frac{\sqrt{x+4} + 2}{\sqrt{x+4} + 2} = \lim_{x \rightarrow 0} \frac{x+4-4}{\sin 3x (\sqrt{x+4} + 2)} = \lim_{x \rightarrow 0} \frac{x}{\sin 3x (\sqrt{x+4} + 2)} = \frac{1}{3} \cdot \frac{1}{\sqrt{4} + 2} = \frac{1}{12}$$

$$14) \lim_{x \rightarrow \infty} (\sqrt{x^2 + 1} - \sqrt{x^2 - x + 1}) = \lim_{x \rightarrow \infty} (\sqrt{x^2 + 1} - \sqrt{x^2 - x + 1}) \cdot \frac{\sqrt{x^2 + 1} + \sqrt{x^2 - x + 1}}{\sqrt{x^2 + 1} + \sqrt{x^2 - x + 1}} = \lim_{x \rightarrow \infty} \frac{x^2 + 1 - x^2 + x - 1}{\sqrt{x^2 + 1} + \sqrt{x^2 - x + 1}} = \lim_{x \rightarrow \infty} \frac{x}{\sqrt{x^2 + 1} + \sqrt{x^2 - x + 1}} = \frac{1}{2}$$

• Proveriti da li je funkcija $f(x) = \begin{cases} (1+x)^{\frac{1}{x}}, & x \neq 0 \\ e, & x = 0 \end{cases}$ neprekidna u tački $x = 0$.
 $f(0) = e$
 $\lim_{x \rightarrow 0} (1+x)^{\frac{1}{x}} = e \Rightarrow f(0) = \lim_{x \rightarrow 0} (1+x)^{\frac{1}{x}} = e = e$
 f je neprekidna u tački $x = 0$

• Proveriti da li je funkcija $f(x) = \begin{cases} \frac{x^2-9}{x-3}, & x \neq 3 \\ 2, & x = 3 \end{cases}$ neprekidna u tački $x = 3$.

$$f(3) = 2$$

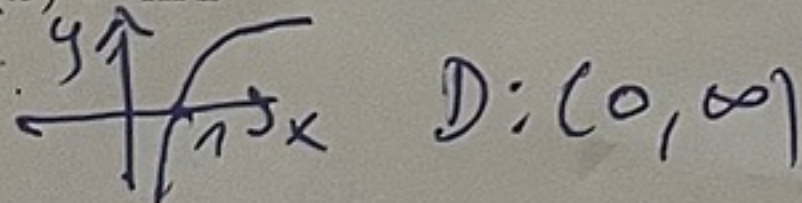
$$\lim_{x \rightarrow 3} \frac{x^2-9}{x-3} = \lim_{x \rightarrow 3} \frac{(x-3)(x+3)}{x-3} = 6$$

$$f(3) \neq \lim_{x \rightarrow 3} \frac{x^2-9}{x-3}$$

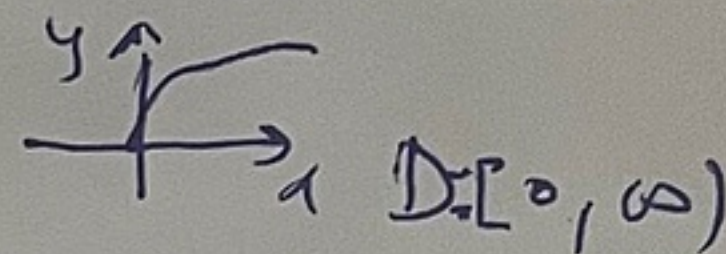
$2 \neq 6$ - nije neprekidna u tački $x = 3$

• Odrediti domen i nacrtati grafik funkcije

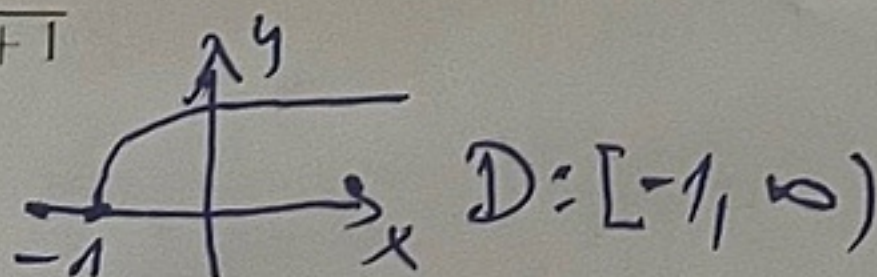
1) $f(x) = \ln x$



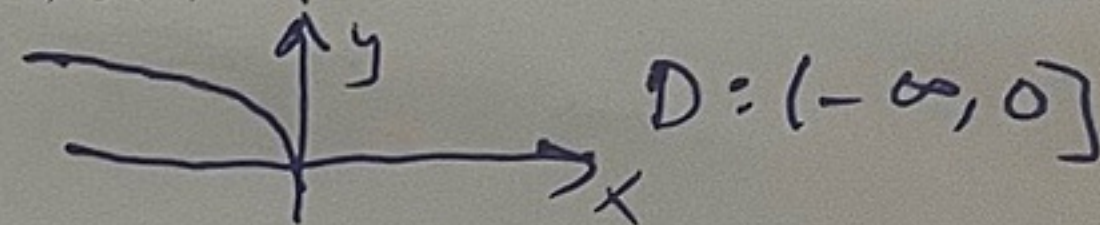
2) $f(x) = \sqrt{x}$



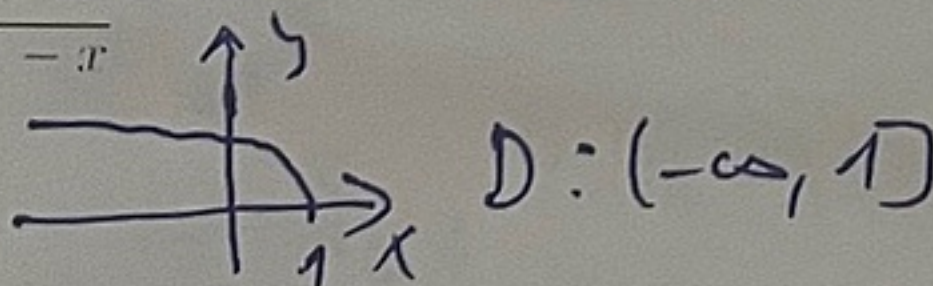
3) $f(x) = \sqrt{x+1}$



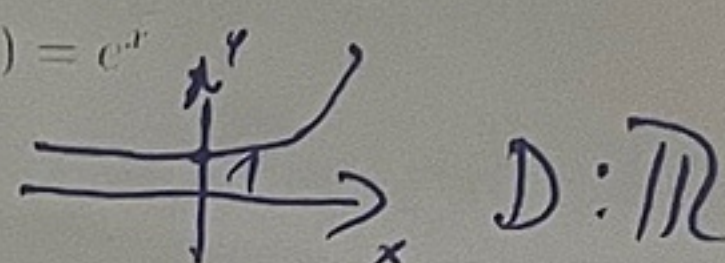
4) $f(x) = \sqrt{-x}$



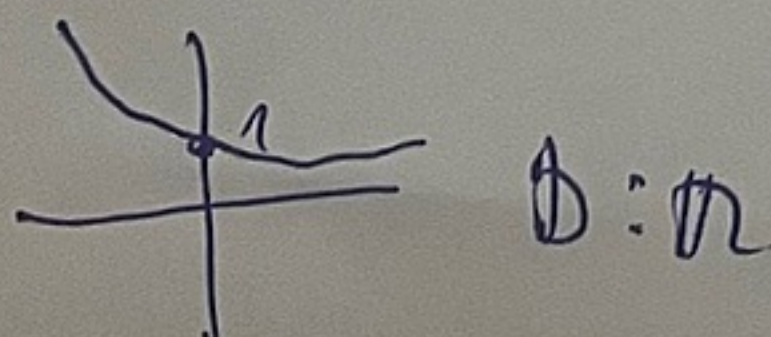
5) $f(x) = \sqrt{1-x}$



6) $f(x) = e^x$



7) $f(x) = e^{-x}$



8) $f(x) = \left(\frac{1}{2}\right)^x$

