

KALKULUA (31Taldea) – MINTEGIETAKO 1. KONTROLA

IZEN-ABIZENAK:

1.- Zerrenda honetako funtzioen adierazpide grafikoak beheko taulan erakusten dira. Idatzi grafiko bakoitzean, grafiko horrek adierazten duen funtzioa:

a) $f(x) = 2^x$

b) $f(x) = \left(\frac{2}{3}\right)^x$

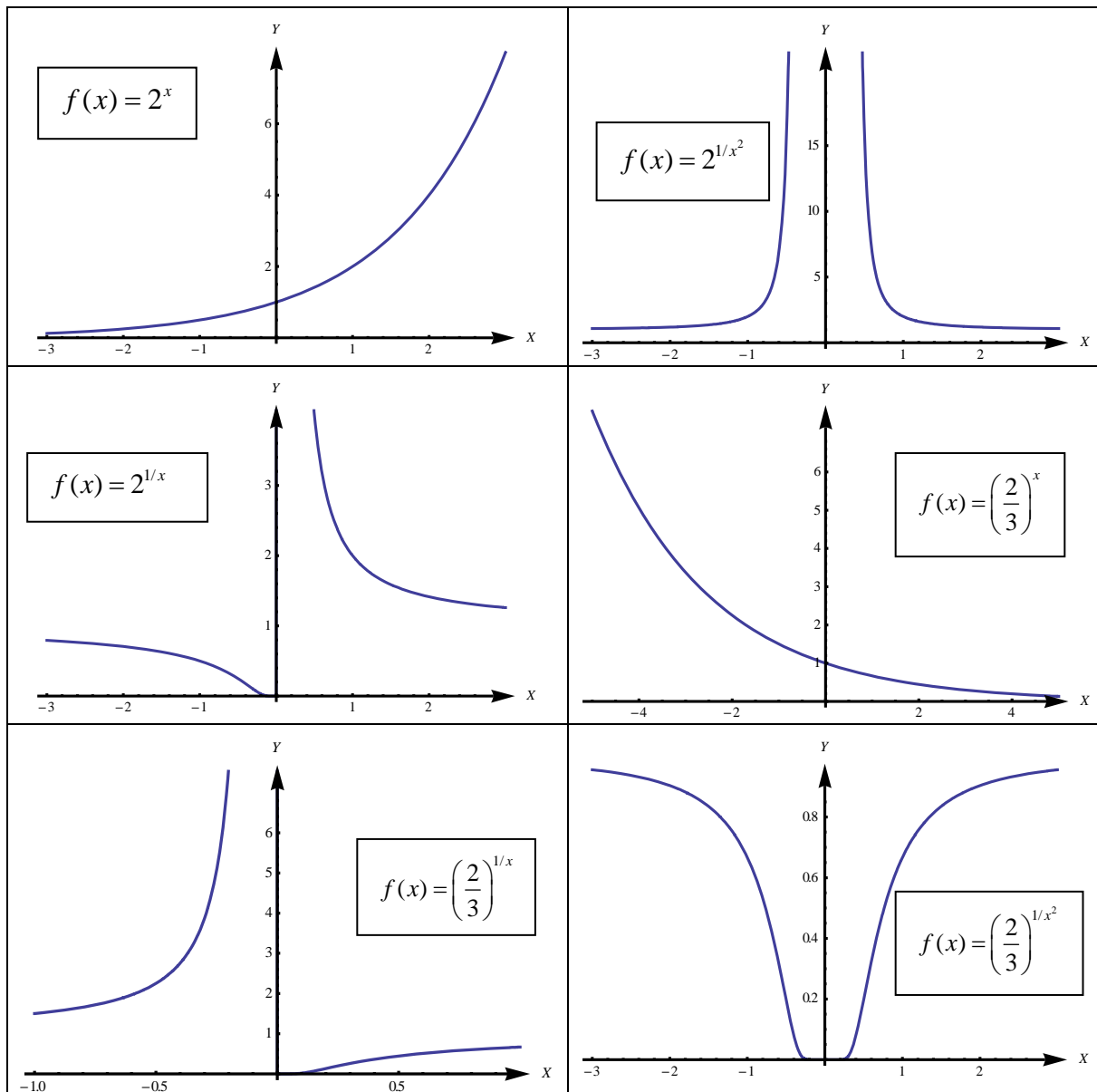
c) $f(x) = \left(\frac{2}{3}\right)^{1/x}$

d) $f(x) = \left(\frac{2}{3}\right)^{1/x^2}$

e) $f(x) = 2^{1/x^2}$

f) $f(x) = 2^{1/x}$

(1.5 puntu)



2.- Aurkitu hurrengo funtzioen definizio-eremua:

(1.5 puntu)

a) $f(x) = \frac{1}{|x|-2} \Rightarrow D = \{x \in \mathbb{R} / |x|-2 \neq 0\} = \{x \in \mathbb{R} / |x| \neq 2\} = \mathbb{R} - \{\pm 2\}$

b) $f(x) = \arcsin\left(\frac{x-1}{3}\right) \Rightarrow D = \left\{x \in \mathbb{R} / -1 \leq \frac{x-1}{3} \leq 1\right\} = \{x \in \mathbb{R} / -3 \leq x-1 \leq 3\} =$
 $= \{x \in \mathbb{R} / -2 \leq x \leq 4\} = [-2, 4]$

c) $f(x) = \arctan\left(\frac{1}{x^2-1}\right) \Rightarrow D = \{x \in \mathbb{R} / x^2-1 \neq 0\} = \{x \in \mathbb{R} / x^2 \neq 1\} = \mathbb{R} - \{\pm 1\}$

d) $f(x) = \frac{\sin x}{L(e^x-1)} \Rightarrow D = \{x \in \mathbb{R} / e^x-1 > 0, L(e^x-1) \neq 0\}$

$$\left. \begin{array}{l} e^x-1 > 0 \Leftrightarrow e^x > 1 \Leftrightarrow x > 0 \\ L(e^x-1) \neq 0 \Leftrightarrow e^x-1 \neq 1 \Leftrightarrow e^x \neq 2 \Leftrightarrow x \neq L2 \end{array} \right\} \Rightarrow D = (0, \infty) - \{L2\}$$

3.- Kalkulatu $\lim_{x \rightarrow 0} \frac{x \cdot \sin\left(\frac{x}{2}\right) \cdot L(1+5x)}{\cos(x^2) \cdot \tan^2(3x) \cdot (e^x-1)}$

(Puntu 1)

$$\lim_{x \rightarrow 0} \frac{x \cdot \sin\left(\frac{x}{2}\right) \cdot L(1+5x)}{\cos(x^2) \cdot \tan^2(3x) \cdot (e^x-1)} \stackrel{(*)}{=} \lim_{x \rightarrow 0} \frac{x \cdot \frac{x}{2} \cdot 5x}{9x^2 \cdot L(e^x)} = \lim_{x \rightarrow 0} \frac{5x}{18x} = \frac{5}{18}$$

$$(*) \quad x \rightarrow 0 \Rightarrow \begin{cases} \sin\left(\frac{x}{2}\right) \sim \frac{x}{2} \\ L(1+5x) \sim 5x \\ \cos(x^2) \rightarrow 1 \\ \tan^2(3x) \sim (3x)^2 = 9x^2 \\ e^x - 1 \sim L(e^x) = x \end{cases}$$