

$$\log_{\frac{1}{2}} \log_{\frac{1}{2}} \left( x + \frac{3}{2} \right) \leq 1$$

$$\begin{cases} x + \frac{3}{2} > 0 \\ \log_{\frac{1}{2}} \left( x + \frac{3}{2} \right) > 0 \end{cases} \begin{cases} x > -\frac{3}{2} \\ x + \frac{3}{2} < 1 \end{cases}$$

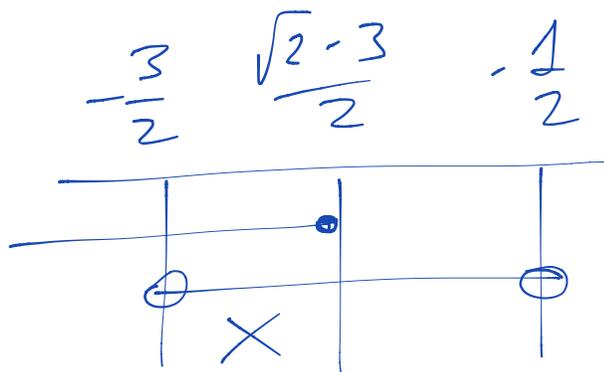
$$\begin{cases} x > -\frac{3}{2} \\ x < -\frac{1}{2} \end{cases} \quad \text{Sol. } E = \left( -\frac{3}{2}, -\frac{1}{2} \right)$$

$$\log_{\frac{1}{2}} \left( x + \frac{3}{2} \right) \geq \frac{1}{2}$$

$$x + \frac{3}{2} \leq \sqrt{\frac{1}{2}} \quad ; \quad x \leq \sqrt{\frac{1}{2}} - \frac{3}{2}$$

$$x \leq \frac{\sqrt{2} - 3}{2}$$

$$\begin{cases} x \leq \frac{\sqrt{2} - 3}{2} \\ -\frac{3}{2} < x < -\frac{1}{2} \end{cases}$$



$$\log_2(x+6) - 2\log_2 x \geq 3\log_2 2$$

$$\begin{cases} x > -6 \\ x > 0 \end{cases} \Rightarrow \text{C.T. } x > 0$$

$$\log_2(x+6) + \log_2 x^{-2} \geq \log_2 8$$

$$\frac{x+6}{x^2} \geq 1, \quad \frac{x+6-x^2}{x^2} \geq 0$$

$$(\log_2 x)^2 + 3\log_2 x \geq \frac{5}{2} \log_{4\sqrt{2}} 19$$

$$\log_2 x = t$$

$$t^2 + 3t \geq \frac{5}{2} \log_{2^{5/2}} 19$$

$$4\sqrt{2} = 2^2 \cdot 2^{1/2} = 2^{5/2}$$

$$\log_{2^{5/2}} 19 = \frac{\log_2 19}{\log_2 2^{5/2}} = \frac{2 \log_2 19}{5}$$

$$t^2 + 3t \geq \log_2 19$$

$$t^2 + 3t - \log_2 19 \geq 0$$

$$t^2 + 3t - 4,25 \geq 0$$

$$\Delta = 9 + 17 = 26$$

$$t = \frac{-3 \pm \sqrt{26}}{2} \begin{matrix} \nearrow 1,1 \\ \searrow -4,1 \end{matrix}$$

$$t \leq -4,1 \vee t \geq 1,1$$

$$\log_2 x \leq -4,1 \vee \log_2 x \geq 1,1$$

$$x \leq 2^{-4,1} \vee x \geq 2^{1,1}$$

$$3^{\frac{x+1}{2}} \cdot 7^{x-1} = \frac{1}{49^x \cdot 9^x}$$

$$3^{\frac{x+1}{2}} \cdot 7^{x-1} = 7^{-2x} \cdot 3^{-2x}$$

$$\frac{7^{x-1}}{7^{-2x}} = \frac{3^{-2x}}{3^{\frac{x+1}{2}}}$$

$$3^{x-1} = 3^{-2x - \frac{x+1}{2}}$$

$$7 = 3$$

$$7^{3^{x-1}} = 3^{\frac{-5x-1}{2}}$$

$$\ln 7^{3^{x-1}} = \ln 3^{\frac{-5x-1}{2}}$$

$$(3x - 1) \ln 7 = \frac{-5x - 1}{2} \ln 3$$

$$6x \ln 7 - 2 \ln 7 = -5x \ln 3 - \ln 3$$

$$6x \ln 7 + 5x \ln 3 = 2 \ln 7 - \ln 3$$

$$x(6 \ln 7 + 5 \ln 3) = 2 \ln 7 - \ln 3$$

$$x = \frac{2 \ln 7 - \ln 3}{6 \ln 7 + 5 \ln 3}$$

$$\left(2^x - \frac{1}{2^3 \sqrt{2}}\right) (3^x - 5) = 0$$

$$2^x - \frac{1}{2^3 \sqrt{2}} = 0$$

$$2^x = \frac{1}{2 \cdot 2^{1/3}}$$

$$3^x - 5 = 0$$

$$3^x = 5$$

$$2^x = 2^{-4/3}$$

$$x = \log_2 5$$

$$x = -4/3$$

$$\frac{14}{\log_5 x+2} + \frac{4}{\log_5 x-1} - 3 = 0$$

$$\log_5 x = t$$

$$C.E. \begin{cases} x > 1 \\ x > -2 \end{cases}$$

$$\frac{14}{t+2} + \frac{4}{t-1} - 3 = 0$$

$$3^{x+1} \cdot 5^{1-x} = 3 \cdot 5$$

$$\frac{3^{x+1} \cdot 5^{1-x}}{3^{2x} \cdot 5^{x-3}} = 1$$

$$3^{-x+1} \cdot 5^{-2x+4} = 1$$

$$\ln \left( 3^{-x+1} \cdot 5^{-2x+4} \right) = 0$$

$$\ln 3^{-x+1} + \ln 5^{-2x+4} = 0$$

$$(-x+1) \ln 3 + (-2x+4) \ln 5 = 0$$

$$f(x) = a \log_2(x+b) \quad a, b \neq 0$$

$$P(0,0)$$

$$\log_2 b = 0 \Rightarrow b = 1$$

$$\begin{cases} y = 4 \\ y = a \log_2(x+1) \end{cases}$$

$$a \log_2(x+1) = 4 \quad , \quad \log_2(x+1) = \frac{4}{a}$$

$$x+1 = 2^{4/a} \quad ; \quad x = 2^{4/a} - 1$$

$$2^{4/a} - 1 = 3 \quad ; \quad 2^{4/a} = 2^2$$

$$\frac{4}{a} = 2 \Rightarrow a = 2$$

$$f(x) = 2 \log_2 (x+1)$$

$$2 \log_2 (x+1) \geq 3 - \log_{\frac{1}{2}} x$$

$$2 \log_2 (x+1) \geq 3 + \log_2 x$$

$$\left\{ \begin{array}{l} x > 0 \\ x+1 > 0 \\ \hline x > 0 \end{array} \right.$$

$$\frac{(x+1)^2}{x} \geq 3$$

$$\frac{x^2 + 2x + 1 - 3x}{x} \geq 0$$

$$\frac{x^2 - x + 1}{x} \geq 0$$

$$f(x) = \frac{2 \ln x}{1 + \ln x}$$

$$C.E. \begin{cases} 1 + \ln x \neq 0 \\ x > 0 \end{cases} \begin{cases} \ln x \neq -1 \\ x > 0 \end{cases}$$

$$\begin{cases} x > 0 \\ x \neq e^{-1} \end{cases} \begin{array}{c} 0 \quad e^{-1} \\ \hline | \quad | \\ \hline \end{array}$$

$$\begin{aligned} D &= (0, e^{-1}) \cup (e^{-1}, +\infty) = \\ &= \mathbb{R}^+ - \{e^{-1}\} \end{aligned}$$

$$f(x) \geq 0 \quad \frac{2 \ln x}{1 + \ln x} \geq 0$$

$$N \geq 0 \quad 2 \ln x \geq 0, \quad x \geq 1$$

$$D > 0 \quad \ln x > -1, \quad x > e^{-1}$$

