DETERMINAREA INTERVALULUI DE CONDIȚII LA LOGARITMI

Găsiți valorile lui x pentru care următoarele expresii au sens:

1) $E(x) = \log_{\frac{3-x}{x+2}} (5-x)$

2) $E(x) = \log_{\frac{4-x}{x+1}} \left(\frac{x^2+x-2}{2x^2-7x+3}\right)$

3) $E(x) = \log_{\frac{2x+1}{4x+2}} (5+x)$

4) $E(x) = \log_{\frac{3-x}{x-1}} \left(\frac{5+x}{x-3}\right)$

5) $E(x) = \log_{x^2-5x+6} \left(\frac{7-x}{x-5}\right)$

8) $E(x) = \log_{x^2} \left(\frac{3+2x}{5x-4}\right)$

9) $E(x) = \log_{3-x} (x^2-4x+4)$

10) $E(x) = \log_{\frac{2x-1}{x+2}} (5-x)$

Prof. Ovidiu Bădescu

Găsiți valorile lui x pentru care expresia

$$E(x) = \log_{\frac{3-x}{x+2}} (5-x)$$ are sens

E_1) în cazul general, $\log_b A = N \Rightarrow$

cond.: $\begin{cases} b > 0 \\ b \neq 1 \\ A > 0 \end{cases}$

E_2) $\log_{\frac{3-x}{x+2}} (5-x) \Rightarrow$ cond.: $\begin{cases} \frac{3-x}{x+2} > 0 \\ \frac{3-x}{x+2} \neq 1 \\ 5-x > 0 \end{cases}$

E_3) $\frac{3-x}{x+2} > 0$

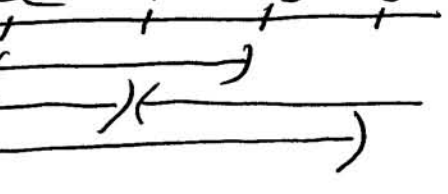
x		-2		3	
$3-x$	$+$	$+$	$+$	0	$-$
$x+2$	$-$	0	$+$	$+$	$+$
$\frac{3-x}{x+2}$	$-$	$\nexists$	$+$	0	$-$

$\Rightarrow \frac{3-x}{x+2} > 0 \Leftrightarrow x \in (-2, 3) = I_1$

E_4) $\frac{3-x}{x+2} \neq 1 \Leftrightarrow 3-x \neq x+2 \Rightarrow -2x \neq -1$

$x \neq \frac{1}{2} \Rightarrow x \in (-\infty, \frac{1}{2}) \cup (\frac{1}{2}, \infty) = I_2$

E_5) $5-x > 0 \Rightarrow -x > -5 \Rightarrow x < 5 \Rightarrow x \in (-\infty, 5) = I_3$



E_6) $I_C = I_1 \cap I_2 \cap I_3$

Prof. Ovidiu Badescu

Se cere $I_C = ?$

$$E(x) = \log_{\frac{4-x}{x+1}} \left(\frac{x^2+x-2}{2x^2-7x+3} \right)$$

E1) Cond:
$$\begin{cases} \frac{4-x}{x+1} > 0 \\ \frac{4-x}{x+1} \neq 1 \\ \frac{x^2+x-2}{2x^2-7x+3} > 0 \end{cases}$$

E2) $\frac{4-x}{x+1} > 0$

x		-1		4	
$4-x$	$+$	$+$	$+$	0	$-$
$x+1$	$-$	0	$+$	$+$	$+$
$\frac{4-x}{x+1}$	$-$	$\nexists$	$+$	0	$-$

$\Rightarrow \frac{4-x}{x+1} > 0 \Leftrightarrow x \in (-1; 4) = I_1$

E3) $\frac{4-x}{x+1} \neq 1 \Rightarrow 4-x \neq x+1 \Rightarrow 2x \neq 3 \Rightarrow x \neq \frac{3}{2}$

$\Rightarrow x \in (-\infty; \frac{3}{2}) \cup (\frac{3}{2}; \infty) = I_2$

E4) $\frac{x^2+x-2}{2x^2-7x+3} > 0$

x		-2		$\frac{1}{2}$		1		3	
x^2+x-2	$+$	0	$-$	$-$	$-$	0	$+$	$+$	$+$
$2x^2-7x+3$	$+$	$+$	$+$	0	$-$	$-$	$-$	0	$+$
$E(x)$	$+$	0	$-$	$\nexists$	$+$	0	$-$	$\nexists$	$+$

$\Rightarrow x \in (-\infty; -2) \cup (\frac{1}{2}; 1) \cup (3; \infty) = I_3$

E5) I_1 $(-1; 4)$

I_2 $(-\infty; \frac{3}{2}) \cup (\frac{3}{2}; \infty)$

I_3 $(-\infty; -2) \cup (\frac{1}{2}; 1) \cup (3; \infty)$

$I_1 \cap I_2 \cap I_3 = (-1; -2) \cup (\frac{1}{2}; 1) \cup (3; 4)$

Prof. Ovidiu Pârvescu

Găsiți intervalul de condiții pt

$$\log_{\frac{3-x}{x-1}}\left(\frac{5+x}{x-3}\right)$$

E_1) Cond: $\begin{cases} \frac{3-x}{x-1} > 0 \\ \frac{3-x}{x-1} \neq 1 \\ \frac{5+x}{x-3} > 0 \end{cases}$

E_2) $\frac{3-x}{x-1} > 0$

$\Leftrightarrow x \in (1;3) = I_1$

x		1		3	
$3-x$	$+$	$+$	$+$	0	$-$
$x-1$	$-$	0	$+$	$+$	$+$
$\frac{3-x}{x-1}$	$-$	$\nexists$	$+$	0	$-$

E_2) $\frac{3-x}{x-1} \neq 1 \Leftrightarrow 3-x \neq x-1 \Leftrightarrow 4 \neq 2x \Leftrightarrow x \neq 2$

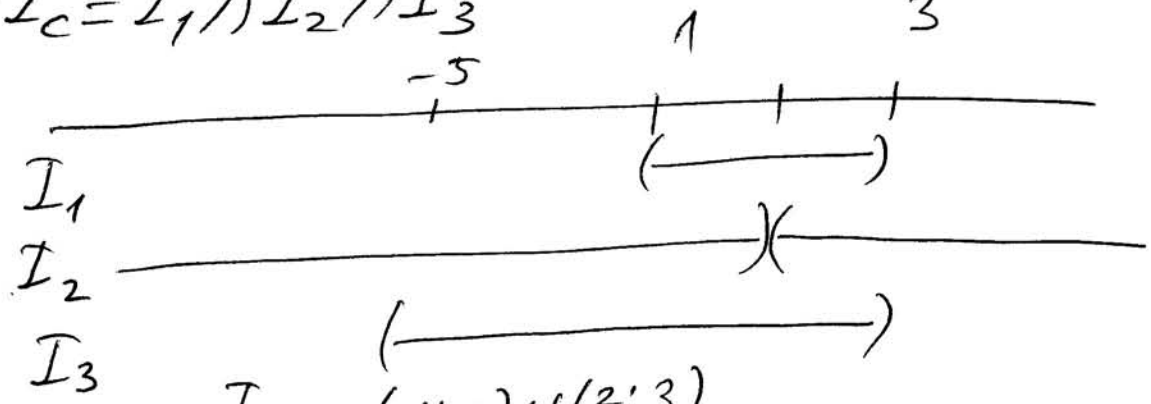
$\Leftrightarrow x \in (-\infty;2) \cup (2;\infty) = I_2$

E_3) $\frac{5+x}{x-3} > 0$

$\Leftrightarrow x \in (-5;3) = I_3$

x		-5		3	
$5+x$	$-$	0	$+$	$+$	$+$
$x-3$	$-$	$-$	$-$	0	$+$
$\frac{5+x}{x-3}$	$-$	0	$+$	$\nexists$	$-$

E_4) $I_c = I_1 \cap I_2 \cap I_3$



$I_c = (1;2) \cup (2;3)$

Prof. Ovidiu Bădescu

Găsiți intervalul de condiții:

$$\log_{\frac{2x-1}{x+2}}(5-x)$$

E_1) cond.: $\begin{cases} \frac{2x-1}{x+2} > 0 \\ \frac{2x-1}{x+2} \neq 1 \\ 5-x > 0 \end{cases}$

E_2) $\frac{2x-1}{x+2} > 0$

x		-2		$\frac{1}{2}$	
$2x-1$	$---$	$\|$	$-$	0	$+++$
$x+2$	$--$	0	$+$	$+$	$+++$
$F(x)$	$+$	$\|$	$-$	0	$+++$

pt că $\frac{2x-1}{x+2} > 0$ trebuie $\boxed{x \in (-\infty, -2) \cup (\frac{1}{2}, \infty) = I_1}$

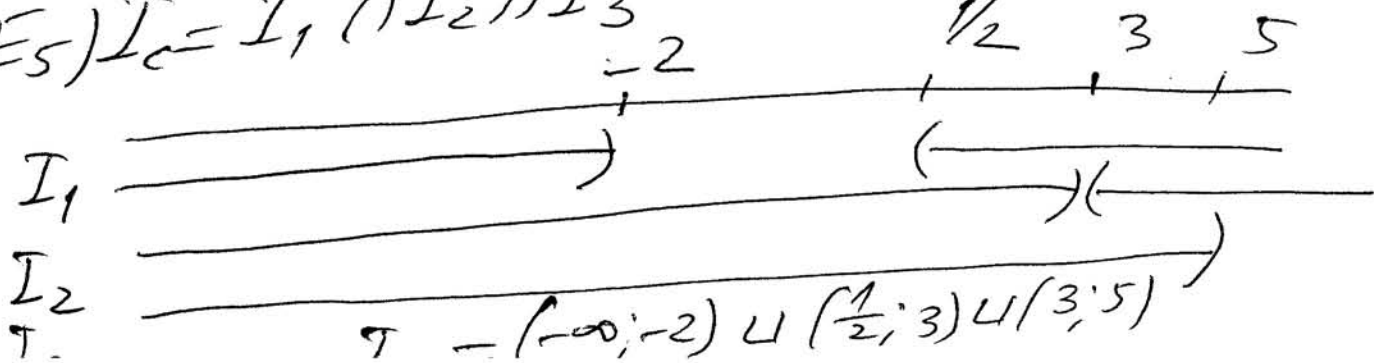
E_3) $\frac{2x-1}{x+2} \neq 1 \Leftrightarrow 2x-1 \neq x+2 \Leftrightarrow x \neq 3$

$\Rightarrow \boxed{x \in (-\infty, 3) \cup (3, \infty) = I_2}$

E_4) $5-x > 0 \Rightarrow -x > -5 \mid \cdot(-1) \Rightarrow$

$\Rightarrow x < 5 \Rightarrow \boxed{x \in (-\infty, 5) = I_3}$

E_5) $I_c = I_1 \cap I_2 \cap I_3$



$T = (-\infty, -2) \cup (\frac{1}{2}, 3) \cup (3, 5)$

Prof. Ovidiu Bădescu