حلول تمارين درس دالة اللوغاريتم العشري

فهرس حلول التمارين

استعمال الخواص الجبرية لتبسيط عبارة:

حل التمرين 1:

- $log(4)=log\left(2^2\right)=2log\,2=2\alpha$.
- $log(16)=log\left(2^4\right)=4log\,2=4\alpha$.
- $log(40)=log(4\times10)=log\,4+log\,10=log\,2^2+1=2log\,2+1=2\alpha+1$.
- $log\left(\frac{1}{4}\right)=-log\,4=-2log\,2=-2\alpha$.
- $log(0{,}2)=log(2\times0{,}1)=log\,2+log\,0{,}1=\alpha-1$.

حل التمرين 2:

- $log(10b)=log\,10+log\,b=1+a$.
- $log\left(\frac{b}{100}\right)=log\,b-log\,10^2=log\,b-2log\,10=a-2$.
- $log\left(\frac{1}{b}\right)=-log\,b=-a$.
- $log\left(\sqrt{b}\right)=\frac{1}{2}log\,b=\frac{1}{2}a$.
- $log\left(b^5\right)=5log\,b=5a$.
- $2log(3b)+log\left(\sqrt[5]{b}\right)-log\,9=2log\,3+2log\,b+\frac{1}{5}log\,b-log\,3^2$

$=2log\,3+\frac{11}{5}log\,b-2log\,3=\frac{11}{5}a$.

حل التمرين 3:

- $A=2log\,3-log\,5=log\,3^2-log\,5=log\left(\frac{9}{5}\right)$.
- $B=3log\,10+log\,0{,}08-5log\,2=log\,10^3+log\left(\frac{8}{10^2}\right)-log\,2^5$

$=log\left(\frac{8\times10^3}{10^2}\right)-log\,32=log\,80-log\,32=log\left(\frac{80}{32}\right)=log\left(\frac{5}{2}\right)$.
- $C=\frac{1}{2}log\,4-3log\,2=log\left(\sqrt{4}\right)-log\left(2^3\right)$

$=log\,2-log\,8=log\left(\frac{2}{8}\right)=log\left(\frac{1}{4}\right)=-log\,4$.
- $D=2log\,5-3log\,2+\frac{1}{2}log\,100=log\,5^2-log\,2^3+log\,\sqrt{100}$

$=log\left(\frac{5^2}{2^3}\right)+log\,10=log\left(\frac{25\times10}{8}\right)=log\left(\frac{250}{8}\right)=log\left(\frac{125}{4}\right)$.
- $E=2log\,5+log\,12-log\,3=log\,5^2+log\,15-log\,3$

$= \log\left(\frac{5^2 \times 15}{3}\right) = \log\left(5^2 \times 5\right) = \log 125$.

❖ $F = \log 3 + \log 5 = \log(3 \times 5) = \log 15$

حل التمرين 4:

❖ $A = \log\left(\frac{3 \times 5^2}{27}\right) = \log\left(3 \times 5^2\right) - \log(27) = \log 3 + \log 5^2 - \log 3^3$

$= \log 3 + 2\log 5 - 3\log 3 = 2\log 5 - 2\log 3$.

❖ $B = \log\left(\frac{25\sqrt{5}}{9}\right) = \log\left(25\sqrt{5}\right) - \log 9 = \log 25 + \log\left(\sqrt{5}\right) - \log 3^2$

$= \log 5^2 + \frac{1}{2}\log 5 - 2\log 3 = 2\log 5 + \frac{1}{2}\log 5 - 2\log 3 = \frac{5}{2}\log 5 - 2\log 3$.

❖ $C = \log\left(\frac{2\sqrt{3}}{3\sqrt{2}}\right) = \log\left(2\sqrt{3}\right) - \log\left(3\sqrt{2}\right) = \log 2 + \frac{1}{2}\log 3 - \log 3 - \frac{1}{2}\log 2$

$= \frac{1}{2}\log 2 - \frac{1}{2}\log 3$.

حل التمرين 5:

❖ $A = \log(ab) + \log\left(\frac{a}{b}\right) - \log\left(a^2\right) + \log 10$

$= \log a + \log b + \log a - \log b - 2\log a + \log 10 = 1$.

❖ $B = \log\left(\frac{1}{a}\right) + \log\left(a^4\right) - \log\left(a^3\right) + \log 1 = -\log a + 4\log a - 3\log a + 0 = 0$.

❖ $C = \log(a+b) + \log(a-b) - \log\left(a^2 - b^2\right) = \log\left[(a+b)(a-b)\right] - \log\left(a^2 - b^2\right)$

$= \log\left(a^2 - b^2\right) - \log\left(a^2 - b^2\right) = 0$.

❖ $D = \log\left(10^2\right) + 2\log\left(\sqrt{10}\right) - \log\left(\frac{1}{10}\right) + \log\left(\frac{2}{10}\right) + \log\left(\frac{10}{2}\right) - 6$

$= 2\log 10 + 2 \times \frac{1}{2}\log 10 + \log 10 + \log 2 - \log 10 + \log 10 - \log 2 - 6$

$= 2 + 1 + 1 - 6 = -2$.

حل التمرين 6:

1) $\log\left(0{,}1 \times \left(a^2\sqrt{\frac{b^2}{a}}\right)^3 \times \frac{a}{b^3}\right) = \log 0{,}1 + \log\left(a^2\sqrt{\frac{b^2}{a}}\right)^3 + \log\left(\frac{a}{b^3}\right)$

$= -1 + \log a^6 + \log\left(\sqrt{\frac{b^2}{a}}\right)^3 + \log a - \log b^3 = -1 + 6\log a + \frac{3}{2}\log\left(\frac{b^2}{a}\right) + \log a - 3\log b$

$= -1 + 6\log a + 3\log b - \frac{3}{2}\log a + \log a - 3\log b = \frac{11}{2}\log a - 1$.

2) $\log\left(\left(\frac{10a^3b^{-2}}{a\sqrt{a^2b^3}}\right)^3\times\left(\frac{a^{-4}b^3}{100\sqrt[4]{b^2a}}\right)^{-2}\right)=\log\left(\frac{10a^3b^{-2}}{a\sqrt{a^2b^3}}\right)^3+\log\left(\frac{a^{-4}b^3}{100\sqrt[4]{b^2a}}\right)^{-2}$

$=3\log\left(\frac{10a^3b^{-2}}{a\sqrt{a^2b^3}}\right)-2\log\left(\frac{a^{-4}b^3}{100\sqrt[4]{b^2a}}\right)$

$=3\log\left(10a^3b^{-2}\right)-3\log\left(a\sqrt{a^2b^3}\right)-2\log\left(a^{-4}b^3\right)+2\log\left(100\sqrt[4]{b^2a}\right)$

$=3\log 10+9\log a-6\log b-3\log a-\frac{3}{2}\log\left(a^2b^3\right)+8\log a-6\log b+2\log 10^2+\frac{2}{4}\log\left(b^2a\right)$

$=3+6\log a-6\log b-3\log a-\frac{9}{2}\log b+8\log a-6\log b+4+\log b+\frac{1}{2}\log a$

$=7+\frac{23}{2}\log a-\frac{31}{2}\log b$.

3) $\log\left(\frac{0,001\left(\sqrt[3]{a^4}b^{-2}\right)^3}{\sqrt{b^3}\sqrt[4]{a^3}}\right)=\log\left(0,001\left(\sqrt[3]{a^4}b^{-2}\right)^3\right)-\log\left(\sqrt{b^3}\sqrt[4]{a^3}\right)$

$=\log 0,001+3\log\left(\sqrt[3]{a^4}b^{-2}\right)-\log\left(\sqrt{b^3}\right)-\log\left(\sqrt[4]{a^3}\right)$

$=\log 10^{-3}+3\times\frac{1}{3}\log a^4+3\log\left(b^{-2}\right)-\frac{1}{2}\log\left(b^3\right)-\frac{1}{4}\log\left(a^3\right)$

$=-3+4\log a-6\log b-\frac{3}{2}\log b-\frac{3}{4}\log a=-3+\frac{13}{4}\log a-\frac{15}{2}\log b$.

4) $\log\left(\frac{10^{-3}a^4\sqrt[3]{b}}{0,01a^2\sqrt{a^3b^2}}\right)=\log\left(10^{-3}a^4\sqrt[3]{b}\right)-\log\left(0,01a^2\sqrt{a^3b^2}\right)$

$=\log 10^{-3}+4\log a+\frac{1}{3}\log b-\log 0,01-2\log a-\frac{1}{2}\log\left(a^3b^2\right)$

$=-3+4\log a+\frac{1}{3}\log b+2-2\log a-\frac{3}{2}\log a-\log b=\frac{1}{2}\log a-\frac{2}{3}\log b-1$.

إيجاد مجموعة تعريف دالة اللوغاريتم العشري:

حل التمرين 7:

1) $f(x)=(2x-1)\log(x+1)$ $\quad x\in D_f\Leftrightarrow x+1>0\Leftrightarrow x>-1\Leftrightarrow D_f=]-1;+\infty[$.

2) $f(x)=5x-\log(4-x)$ $\quad x\in D_f\Leftrightarrow 4-x>0\Leftrightarrow x<4\Leftrightarrow D_f=]-\infty;4[$.

3) $f(x)=\log\left(x^2+2x\right)$ $\quad x\in D_f\Leftrightarrow x^2+2x>0\Leftrightarrow x(x+2)>0$

$\Leftrightarrow D_f=]-\infty;-2[\cup]0;+\infty[$.

4) $f(x)=log\left(\frac{x+2}{x}\right)$ $x\in D_f \Leftrightarrow \frac{x+2}{x}>0$; $x\neq 0 \Leftrightarrow D_f=]-\infty;-2[\cup]0;+\infty[$.

x	$-\infty$		-2		0		$+\infty$
$x+2$	$-$	0	$+$			$+$	
x	$-$		$-$	0		$+$	
$\frac{x+2}{x}$	$+$	0	$-$	‖		$+$	

حل التمرين 8:

1) $f(x)=log(4-3x)$ $x\in D_f \Leftrightarrow 4-3x>0 \Leftrightarrow x<\frac{4}{3} \Leftrightarrow D_f=\left]-\infty;\frac{4}{3}\right[$.

2) $f(x)=log\left(4-x^2\right)$ $x\in D_f \Leftrightarrow 4-x^2>0 \Leftrightarrow (2-x)(2+x)>0 \Leftrightarrow D_f=]-2;2[$.

3) $f(x)=log\left(\frac{(2x-3)^2}{2-x}\right)$ $x\in D_f \Leftrightarrow \frac{(2x-3)^2}{2-x}>0$; $2-x\neq 0$

$\Leftrightarrow 2x-3\neq 0$; $2-x>0 \Leftrightarrow x\neq\frac{3}{2}$; $x<2 \Leftrightarrow D_f=\left]-\infty;\frac{3}{2}\right[\cup\left]\frac{3}{2};2\right[$.

4) $f(x)=log\left(\frac{4x-1}{x-3}\right)$ $x\in D_f \Leftrightarrow \frac{4x-1}{x-3}>0$; $x-3\neq 0 \Leftrightarrow D_f=\left]-\infty;\frac{1}{4}\right[\cup]3;+\infty[$.

x	$-\infty$		$\frac{1}{4}$		3		$+\infty$
$4x-1$	$-$	0	$+$			$+$	
$x-3$	$-$		$-$	0		$+$	
$\frac{4x-1}{x-3}$	$+$	0	$-$	‖		$+$	

5) $f(x)=log|5x-1|$ $x\in D_f \Leftrightarrow |5x-1|>0 \Leftrightarrow 5x-1\neq 0 \Leftrightarrow x\neq\frac{1}{5} \Leftrightarrow D_f=\mathbb{R}\setminus\left\{\frac{1}{5}\right\}$.

6) $f(x)=log\left(\frac{x^3-6x^2+11x-6}{x^2+3x+2}\right)$ $x\in D_f \Leftrightarrow \frac{x^3-6x^2+11x-6}{x^2+3x+2}>0$; $x^2+3x+2\neq 0$

$\Leftrightarrow \frac{(x-1)(x-2)(x-3)}{(x+1)(x+2)}>0$; $(x+1)(x+2)\neq 0 \Leftrightarrow D_f=]-2;-1[\cup]1;2[\cup]3;+\infty[$.

x	$-\infty$		-2		-1		1		2		3	$+\infty$
$x-1$	$-$		$-$		$-$	0	$+$		$+$		$+$	
$x-2$	$-$		$-$		$-$		$-$	0	$+$		$+$	
$x-3$	$-$		$-$		$-$		$-$		$-$	0	$+$	
$(x-1)(x-2)(x-3)$	$-$		$-$		$-$	0	$+$	0	$-$	0	$+$	
$x+1$	$-$		$-$	0	$+$		$+$		$+$		$+$	
$x+2$	$-$	0	$+$		$+$		$+$		$+$		$+$	
$(x+1)(x+2)$	$+$	0	$-$	0	$+$		$+$		$+$		$+$	
$\frac{(x-1)(x-2)(x-3)}{(x+1)(x+2)}$	$-$	‖	$+$	‖	$-$	‖	$+$	‖	$-$	‖	$+$	

حل معادلة تتضمن دالة اللوغاريتم العشري:

حل التمرين 9:

1) $\forall x\in]0;+\infty[\ ; \log x=1\Leftrightarrow x=10^1=10$ $S=\{10\}$.

2) $\forall x\in]0;+\infty[\ ; \log x=3\Leftrightarrow x=10^3=1000$ $S=\{1000\}$.

3) $\forall x\in]0;+\infty[\ ; \log x=-4\Leftrightarrow x=10^{-4}=\dfrac{1}{10000}=0{,}0001$ $S=\{0{,}0001\}$.

4) $x\in D\Leftrightarrow \begin{cases} x+4>0\\ x>0\end{cases}\Leftrightarrow x>0\Leftrightarrow D=]0;+\infty[$.

❖ $\forall x\in]0;+\infty[\ ; \log(x+4)+\log x=0\Leftrightarrow \log\left[x(x+4)\right]=0\Leftrightarrow \log\left[x^2+4x\right]=0$

$\Leftrightarrow \log\left[x^2+4x\right]=\log 1\Leftrightarrow x^2+4x=1\Leftrightarrow x^2+4x-1=0$.

❖ $\Delta=20>0\Rightarrow x_1=-2-\sqrt{5}<0$; $x_2=-2+\sqrt{5}$ $S=\left\{-2+\sqrt{5}\right\}$.

5) $x\in D\Leftrightarrow \begin{cases} x+3>0\\ x+5>0\end{cases}\Leftrightarrow x>-3\Leftrightarrow D=]-3;+\infty[$.

❖ $\forall x\in]-3;+\infty[\ ; \log(x+3)+\log(x+5)=\log 15\Leftrightarrow \log\left[(x+3)(x+5)\right]=\log 15$

$\Leftrightarrow \log\left[x^2+8x+15\right]=\log 15\Leftrightarrow x^2+8x+15=15\Leftrightarrow x^2+8x=0\Leftrightarrow x(x+8)=0$

$\Leftrightarrow x=0$; $x=-8<-3$ $S=\{0\}$.

6) $x\in D\Leftrightarrow \begin{cases} x+1>0\\ 1-2x>0\end{cases}\Leftrightarrow \begin{cases} x>-1\\ x<\dfrac{1}{2}\end{cases}\Leftrightarrow D=\left]-1;\dfrac{1}{2}\right[$.

❖ $\forall x\in \left]-1;\dfrac{1}{2}\right[\ ; \log(x+1)=3-\log(1-2x)\Leftrightarrow \log(x+1)+\log(1-2x)=3$

$\Leftrightarrow \log\left[(x+1)(1-2x)\right]=3\Leftrightarrow \log\left[-2x^2-x+1\right]=3\Leftrightarrow -2x^2-x+1=10^3$

$\Leftrightarrow -2x^2-x-999=0\Leftrightarrow 2x^2+x+999=0$ $\Delta=-7991<0$ $S=\varnothing$.

7) $x\in D\Leftrightarrow \begin{cases} 1-x>0\\ x+1>0\end{cases}\Leftrightarrow \begin{cases} x<1\\ x>-1\end{cases}\Leftrightarrow D=]-1;1[$.

❖ $\forall x\in]-1;1[\ ; \log(1-x)-\log(x+1)=-2\Leftrightarrow \log\left(\dfrac{1-x}{x+1}\right)=-2\Leftrightarrow \dfrac{1-x}{x+1}=10^{-2}$

$\Leftrightarrow \dfrac{1-x}{x+1}=\dfrac{1}{100}\Leftrightarrow 100(1-x)=x+1\Leftrightarrow 99-101x=0\Leftrightarrow x=\dfrac{99}{101}$ $S=\left\{\dfrac{99}{101}\right\}$.

8) $x\in D\Leftrightarrow \begin{cases} x+1>0\\ x-1>0\end{cases}\Leftrightarrow \begin{cases} x>-1\\ x>1\end{cases}\Leftrightarrow D=]1;+\infty[$.

❖ $\forall x\in]1;+\infty[\ ; \log(x+1)+\log(x-1)=\log 3+4\log 2\Leftrightarrow \log\left[(x+1)(x-1)\right]=\log\left(3\times 2^4\right)$

$\Leftrightarrow \log\left(x^2-1\right)=\log 48\Leftrightarrow x^2-1=48\Leftrightarrow x^2-49=0\Leftrightarrow x=-7<1$; $x=7$ $S=\{7\}$.

9) $x\in D\Leftrightarrow\begin{cases}x^2+5x+6>0\\x+11>0\end{cases}\Leftrightarrow\begin{cases}x\in\left]-\infty;-3\right[\cup\left]-2;+\infty\right[\\x>-11\end{cases}\Leftrightarrow D=\left]-11;-3\right[\cup\left]-2;+\infty\right[$.

❖ $\forall x\in\left]-11;-3\right[\cup\left]-2;+\infty\right[;log\left(x^2+5x+6\right)=log\left(x+11\right)\Leftrightarrow x^2+5x+6=x+11$

$\Leftrightarrow x^2+4x-5=0\ \ \Delta=36>0\Rightarrow x_1=-5\ ;\ x_2=1\ \ S=\{-5;1\}$.

10) $x\in D\Leftrightarrow\begin{cases}1-5x>0\\x+1>0\end{cases}\Leftrightarrow\begin{cases}x<\dfrac{1}{5}\\x>-1\end{cases}\Leftrightarrow D=\left]-1;\dfrac{1}{5}\right[$.

❖ $\forall x\in\left]-1;\dfrac{1}{5}\right[;log\left(1-5x\right)-log\left(x+1\right)=-1\Leftrightarrow log\left(\dfrac{1-5x}{x+1}\right)=-1\Leftrightarrow\dfrac{1-5x}{x+1}=10^{-1}$

$\Leftrightarrow\dfrac{1-5x}{x+1}=\dfrac{1}{10}\Leftrightarrow10\left(1-5x\right)=x+1\Leftrightarrow9-51x=0\Leftrightarrow x=\dfrac{9}{51}=\dfrac{3}{17}\ \ S=\left\{\dfrac{3}{17}\right\}$.

حل التمرين 10:

1) $\forall x\in\left]0;+\infty\right[;\left(log\,x\right)^2-3log\,x-4=0\Leftrightarrow\begin{cases}X=log\,x\\X^2-3X-4=0\end{cases}$

❖ $\Delta=25>0\Rightarrow X_1=-1\ ;\ X_2=4$

❖ $X_1=log\,x=-1\Leftrightarrow x=10^{-1}=0{,}1$

❖ $X_2=log\,x=4\Leftrightarrow x=10^4=10000\ \ S=\{0{,}1;10000\}$.

2) $\forall x\in\left]0;+\infty\right[;2\left(log\,x\right)^2-log\,x-1=0\Leftrightarrow\begin{cases}X=log\,x\\2X^2-X-1=0\end{cases}$

❖ $\Delta=9>0\Rightarrow X_1=-\dfrac{1}{2}\ ;\ X_2=1$

❖ $X_1=log\,x=-\dfrac{1}{2}\Leftrightarrow x=10^{-\frac{1}{2}}=\dfrac{1}{\sqrt{10}}$

❖ $X_2=log\,x=1\Leftrightarrow x=10\ \ S=\left\{\dfrac{1}{\sqrt{10}};10\right\}$.

3) $\forall x\in\left]0;+\infty\right[;\left(log\,x\right)^2+log\,x-12=0=0\Leftrightarrow\begin{cases}X=log\,x\\X^2+X-12=0\end{cases}$

❖ $\Delta=49>0\Rightarrow X_1=-4\ ;\ X_2=3$

❖ $X_1=log\,x=-4\Leftrightarrow x=10^{-4}=\dfrac{1}{10000}$

❖ $X_2=log\,x=3\Leftrightarrow x=10^3=1000\ \ S=\left\{\dfrac{1}{10000};1000\right\}$.

حل متراجحة تتضمن دالة اللوغاريتم العشري:

حل التمرين 11:

1) $\forall x\in\left]0;+\infty\right[;\log x>\frac{1}{2}\Leftrightarrow x>10^{\frac{1}{2}}\Leftrightarrow x>\sqrt{10}$ $S=\left]\sqrt{10};+\infty\right[$.

2) $x\in D\Leftrightarrow\begin{cases}3x^2-x-2>0\\6x+4>0\end{cases}\Leftrightarrow\begin{cases}x\in\left]-\infty;-\frac{2}{3}\right[\cup\left]1;+\infty\right[\\x>-\frac{2}{3}\end{cases}\Leftrightarrow D=\left]1;+\infty\right[$.

❖ $\forall x\in\left]1;+\infty\right[;\log\left(3x^2-x-2\right)>\log\left(6x+4\right)\Leftrightarrow 3x^2-x-2>6x+4\Leftrightarrow 3x^2-7x-6>0$

$\Delta=121>0\Rightarrow x_1=-\frac{2}{3}\ ;\ x_2=3$

❖ $3x^2-7x-6>0\Leftrightarrow x<-\frac{2}{3}\ ;\ x>3$ $S=\left]3;+\infty\right[$.

3) $\forall x\in\left]0;+\infty\right[;2\log x\le -3\Leftrightarrow \log x^2\le -3\Leftrightarrow x^2\le 10^{-3}\Leftrightarrow x^2\le\frac{1}{10^3}\Leftrightarrow x^2-\frac{1}{10^3}\le 0$

$\Leftrightarrow x^2-\left(\frac{1}{\sqrt{10^3}}\right)^2\le 0\Leftrightarrow\left(x-\frac{1}{10\sqrt{10}}\right)\left(x+\frac{1}{10\sqrt{10}}\right)\le 0\Leftrightarrow x\in\left]-\frac{1}{10\sqrt{10}};\frac{1}{10\sqrt{10}}\right[$

$S=\left]0;\frac{1}{10\sqrt{10}}\right[$.

4) $x\in D\Leftrightarrow\begin{cases}3-x>0\\x+1>0\\25x-49>0\end{cases}\Leftrightarrow\begin{cases}x<3\\x>-1\\x>\frac{49}{25}\end{cases}\Leftrightarrow D=\left]\frac{49}{25};3\right[$.

❖ $\forall x\in\left]\frac{49}{25};3\right[;\log 24+\log\left(3-x\right)<\log\left(x+1\right)+\log\left(25x-49\right)$

$\Leftrightarrow \log\left[24\left(3-x\right)\right]<\log\left[\left(x+1\right)\left(25x-49\right)\right]$

$\Leftrightarrow \log\left(72-24x\right)<\log\left(25x^2-24x-49\right)\Leftrightarrow 72-24x<25x^2-24x-49$

$\Leftrightarrow 25x^2-121>0\Leftrightarrow\left(5x-11\right)\left(5x+11\right)>0\Leftrightarrow x\in\left]-\infty;-\frac{11}{5}\right[\cup\left]\frac{11}{5};+\infty\right[$

$S=\left]\frac{11}{5};3\right[$.

5) $x\in D\Leftrightarrow\begin{cases}2x+1\neq 0\\x+3\neq 0\end{cases}\Leftrightarrow\begin{cases}x\neq -\frac{1}{2}\\x\neq -3\end{cases}\Leftrightarrow D=\mathbb{R}\setminus\left\{-3;-\frac{1}{2}\right\}$.

❖ $\forall x \in \mathbb{R} \setminus \left\{-3;-\frac{1}{2}\right\}; log|2x+1|+log|x+3|<1 \Leftrightarrow log\left(|2x+1||x+3|\right)<1$

$\Leftrightarrow log|2x^2+7x+3|<1 \Leftrightarrow |2x^2+7x+3|<10 \Leftrightarrow \begin{cases} -10<2x^2+7x+3 \\ 2x^2+7x+3<10 \end{cases}$

$\Leftrightarrow \begin{cases} 2x^2+7x+13>0 \\ 2x^2+7x-7<0 \end{cases} \Leftrightarrow \begin{cases} x \in \mathbb{R} \\ x \in \left]\frac{-7-\sqrt{105}}{4};\frac{-7+\sqrt{105}}{4}\right[\end{cases} \Leftrightarrow x \in \left]\frac{-7-\sqrt{105}}{4};\frac{-7+\sqrt{105}}{4}\right[$

$S = \left]\frac{-7-\sqrt{105}}{4};-3\right[\cup \left]-3;-\frac{1}{2}\right[\cup \left]-\frac{1}{2};\frac{-7+\sqrt{105}}{4}\right[$.

6) $x \in D \Leftrightarrow \begin{cases} x+2>0 \\ x-4>0 \\ x-1>0 \end{cases} \Leftrightarrow \begin{cases} x>-2 \\ x>4 \\ x>1 \end{cases} \Leftrightarrow D =]4;+\infty[$.

❖ $\forall x \in]4;+\infty[; log(x+2)+log(x-4)<2log(x-1)$

$\Leftrightarrow log\left[(x+2)(x-4)\right]<log(x-1)^2 \Leftrightarrow log\left(x^2-2x-8\right)<log\left(x^2-2x+1\right)$

$\Leftrightarrow x^2-2x-8<x^2-2x+1 \Leftrightarrow 9>0$ $S =]4;+\infty[$.

تمّ بحمد الله وتوفيقه