EXPLICITAREA FUNCȚIILOR DATE PRIN MIN și MAX

Explicitați funcțiile următoare:

1) $f(x) = \min(1; x; x^2; x^3)$

2) $f(x) = \max(64; x+1; x^2+2x+1)$

3) $g(x) = \min(x+2; x^2+3x+3; 4x+5)$

4) $f(x) = \min(x+1; x^2-2x+1; 4x+1)$

5) $f(x) = \max(x+3; x^2+5x+7; 4x+9)$

6) $f(x) = \max(-x+2; x^2-3x+3; -4x+5)$

7) $f(x) = \min(3x+1; x+5; -x+13; 1)$

8) $f(x) = \max(64; x^3-3x^2+3x-1; x^2-2x+1)$

9) $f(x) = \min(8; x^3+3x^2+3x+1; x+1)$

10) $f(x) = \max(8; (x-2)^3; (2x-4)^3)$

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Explicitarea funcțiilor:

$$f(x) = \min(8;\ x^3+3x^2+3x+1;\ x+1)$$

$E_1)\ 8 = x^3+3x^2+3x+1 \Leftrightarrow x^3+3x^2+3x-7=0$

$E_2)$

	x^3	x^2	x	x^0
	1	3	3	-7
1	1	$1\cdot1+3=4$	$1\cdot4+3=7$	$1\cdot7+(-7)=0$

$D_{-7} = \{\pm1, \pm7\}$

$\Rightarrow (x-1)(1\cdot x^2+4x+7)=0 \Rightarrow$ $\boxed{x=1}$ sau $x^2+4x+7=0$

$x_{1,2} = \frac{-4\pm\sqrt{16-28}}{2\cdot1} \notin \mathbb{R}$

$E_3)\ 8 = x+1 \Rightarrow \boxed{x=7}$

$E_4)\ x^3+3x^2+3x+1 = x+1 \Rightarrow x^3+3x^2+2x=0$

$x(x^2+3x+2)=0 \Rightarrow$ $\boxed{x_1=0}$ sau $x^2+3x+2=0 \Rightarrow x_{1,2} = \frac{-3\pm\sqrt{9-8}}{2} = \frac{-3\pm1}{2}$

$\begin{matrix}-1\\-2\end{matrix} \Rightarrow \boxed{x=-1}$ $\boxed{x=-2}$

$E_5)$

x	$-\infty$	-3	-2	$-\frac{3}{2}$	-1	$-\frac{1}{2}$	0	$\frac{1}{2}$	1	2	7	8
$f_1 = 8$		8	8		8		8		8	8	8	
$f_2 = x^3+3x^2+3x+1$		-8	-1									
$f_3 = x+1$		-2	$-\frac{1}{2}$									
MIN		x^3+3x^2+3x+1	$x+1$									

$x=-3 \Rightarrow f_2(-3) = -27+27-9+1 \leq -8 \therefore f_3(-3)$

$x=-\frac{3}{2} \Rightarrow f_2(-\frac{3}{2}) = -\frac{27}{8}+\frac{27}{4}-\frac{9}{2}+1 = \frac{-27+54-36+8}{8} = -\frac{1}{8}$

$E_6)\ f(x) = \begin{cases} x^3+3x^2+3x+1, & x\in(-\infty;-2] \\ x+1, & x\in(-2;-1] \\ & x\in(-1;0] \\ & x\in(0;1] \end{cases}$

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Explicitați $f(x) = \max(64; x+1; x^2+2x+1)$

$E_1)$ $64 = x+1 \Rightarrow x = 63$

$64 = x^2+2x+1 \Rightarrow x^2+2x-63=0$

$\Rightarrow x_{1,2} = \frac{-2 \pm \sqrt{4+252}}{2 \cdot 1} = \frac{-2 \pm 16}{2} \begin{matrix} 7 \\ -9 \end{matrix}$

$x+1 = x^2+2x+1 \Rightarrow x^2+x=0$

$x_{1,2} = \frac{-1 \pm \sqrt{1-0}}{2 \cdot 1} = \frac{-1 \pm 1}{2} \begin{matrix} 0 \\ -1 \end{matrix}$

$E_2)$

x	-10	-9	-2	-1	$-\frac{1}{2}$	0	1	7	8	63	64
64	64	64	64	64		64		64		64	
$x+1$	-9	-1	$\frac{1}{2}$	2		9		65			
x^2+2x+1	81	1	$\frac{1}{4}$	4		73		4225			
MAX	x^2+2x+1	64	64	64		x^2+2x+1		x^2+2x+1			

$E_3)$ $f(x) = \begin{cases} x^2+2x+1, & x \in (-\infty; -9] \\ 64, & x \in (-9; 7] \\ x^2+2x+1, & x \in (7; \infty) \end{cases}$

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