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1. $||x| + 3x| \leq 2$

$-2 \leq |x| + 3x \leq 2$

a) $|x| + 3x \geq -2$

$x \geq -3x - 2$ atau $x \leq 3x + 2$

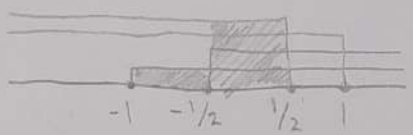
| | |
|---|---|
| $3x + x \geq -2$ | $-3x + x \leq 2$ |
| $4x \geq -2$ | $-2x \leq 2$ |
| $x \geq -1/2$ | $x \geq -1$ |

b) $|x| + 3x \leq 2$

$|x| \leq -3x + 2$

$3x - 2 \leq x \leq -3x + 2$

| | |
|---|---|
| $3x - 2 \leq x$ | $x \leq -3x + 2$ |
| $2x \leq 2$ | $4x \leq 2$ |
| $x \leq 1$ | $x \leq 1/2$ |

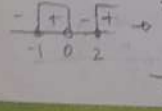



Hp = $\{x | -1 \leq x \leq 1/2\}$

2. $|x - 1| \geq \frac{2}{x}$

$x - 1 \geq \frac{2}{x}$ atau $x - 1 \leq -\frac{2}{x}$

| | |
|---|---|
| $x - 1 - \frac{2}{x} \geq 0$ | $x - 1 + \frac{2}{x} \leq 0$ |
| $\frac{x^2 - x - 2}{x} \geq 0$ | $\frac{x^2 - x + 2}{x} \leq 0$ |
| $\frac{(x+1)(x-2)}{x} \geq 0$ | $D = b^2 - 4.a.c$ |
| $x = -1, x = 2, x \neq 0$ | $= (-1)^2 - 4.1.2$ |
| | $= 1 - 8 = -7$ |
| | Hp = $\emptyset$, $D < 0$, $a > 0$ → Def (+) |
| | $x < 0$ |

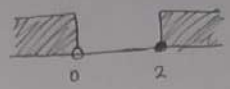



→ $x - 1 \geq 0$, $x \geq 1$





→ $x - 1 \leq 0$, $x \leq 1$


Hp = $\{x | x < 0 \cup x \geq 2\}$

3. $x - 1 \geq \frac{2}{|x|}$

a) $x \geq 0$

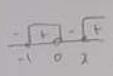
$x - 1 \geq \frac{2}{x}$

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

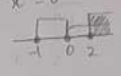
$\frac{x^2 - x - 2}{x} \geq 0$

$(x+1)(x-2)$

$x = -1, x = 2, x \neq 0$




→ $x \geq 0$




b) $x < 0$

$x - 1 \geq -\frac{2}{x}$

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

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

$D = -7$ Def (+)

$x \geq 0$, $x < 0$ → Hp = $\emptyset$

Hp = $\{x | x \geq 2\}$

4. $2x + 3 \geq |4x + 5|$

$(2x+3)^2 \geq (4x+5)^2$

$(2x+3)^2 - (4x+5)^2 \geq 0$

$\left((2x+3) + (4x+5)\right)\left((2x+3) - (4x+5)\right) \geq 0$

$(6x+8)(-2x-2)$

$x = -4/3$, $x = -1$


Hp = $\{x | -4/3 \leq x \leq -1\}$

5. $\left|\frac{2}{x} - x\right| \geq 1$

$\left(\frac{2}{x} - x\right)^2 \geq (1)^2$

$\left(\frac{2}{x} - x\right) - (1)^2 \geq 0$

$\left(\left(\frac{2}{x} - x\right) + 1\right)\left(\left(\frac{2}{x} - x\right) - 1\right) \geq 0$

$\left(\frac{x^2 + x + 2}{x}\right)\left(\frac{-x^2 - x + 2}{x}\right) \geq 0$

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

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

$x = -1, x = 2, x = 1, x = -2$

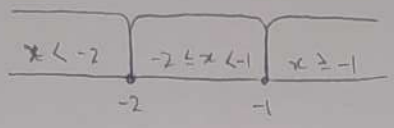
$x \neq 0$


Hp = $(-\infty, -2) \cup [-1, 0) \cup (0, 1] \cup [2, \infty)$

6. $|x+1| + 2|x+2| \geq 2$

▷ $|x+1| \begin{cases} x+1, & x \geq -1 \\ -x-1, & x < -1 \end{cases}$

▷ $|x+2| \begin{cases} x+2, & x \geq -2 \\ -x-2, & x < -2 \end{cases}$




▷ Bagian I

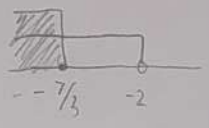
$x < -2$

$-x - 1 + 2(-x-2) \geq 2$

$-x - 1 - 2x - 4 - 2 \geq 2$

$-3x \geq 7$

$x \leq -\frac{7}{3}$




▷ Bagian II

$-2 \leq x < -1$

$-x - 1 + 2(x+2) \geq 2$

$-x - 1 + 2x + 4 \geq 2$

$x \geq -1$


▷ Bagian III

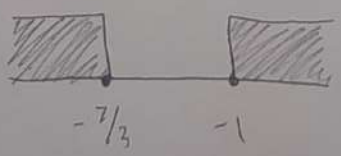
$x \geq -1$

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

$x + 1 + 2x + 4 \geq 2$

$3x \geq -3$

$x \geq -1$


Hp: $\{x \mid x \leq -\frac{7}{3} \cup x \geq -1\}$