



数学I

第1章 数と式

絶対値の場合分け



$$|x| = \begin{cases} x \geq 0 & \text{or} & x \\ x < 0 & \text{or} & -x \end{cases}$$



<まとめ>

C は正の定数

$$|x| = C \Leftrightarrow x = \pm C$$

$$|x| < C \Leftrightarrow -C < x < C$$

$$|x| > C \Leftrightarrow x < -C, C < x$$

(ex) (i) $|x-2| = 3x$

(i) $x-2 \geq 0$

すなわち $x \geq 2$ or \bar{x}

$$x-2 = 3x$$

$$-2x = 2$$

$$x = -1$$

不適

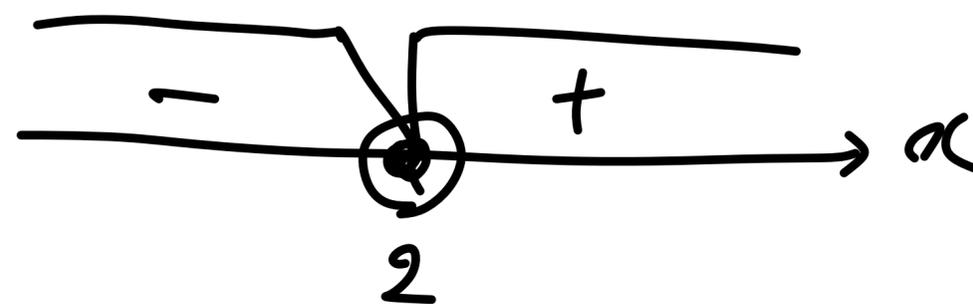
(ii) $x-2 < 0$

すなわち $x < 2$ or \bar{x}

$$-(x-2) = 3x$$

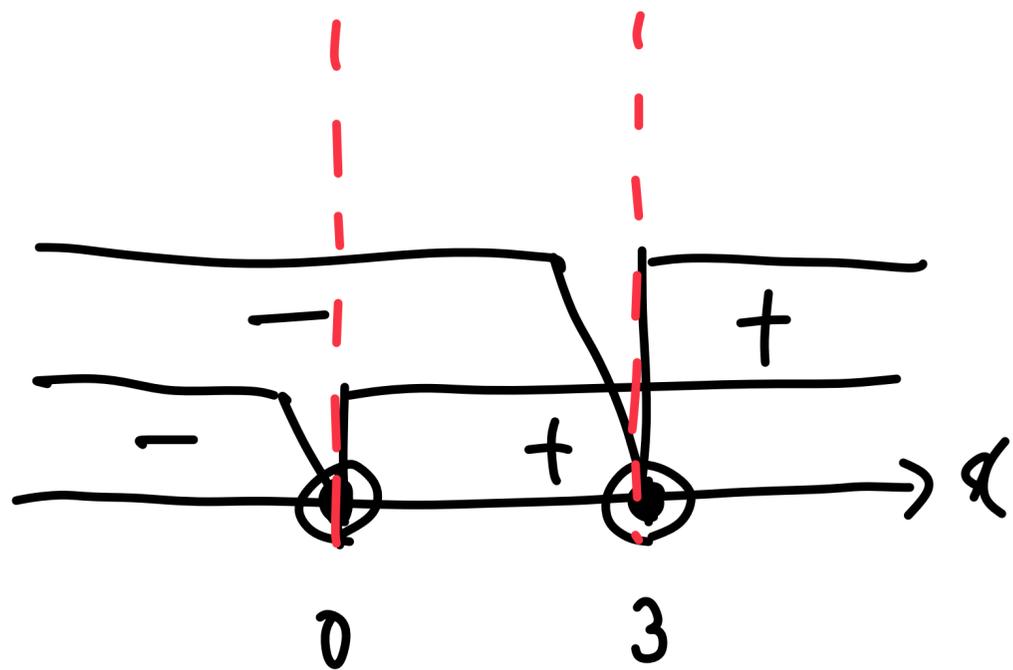
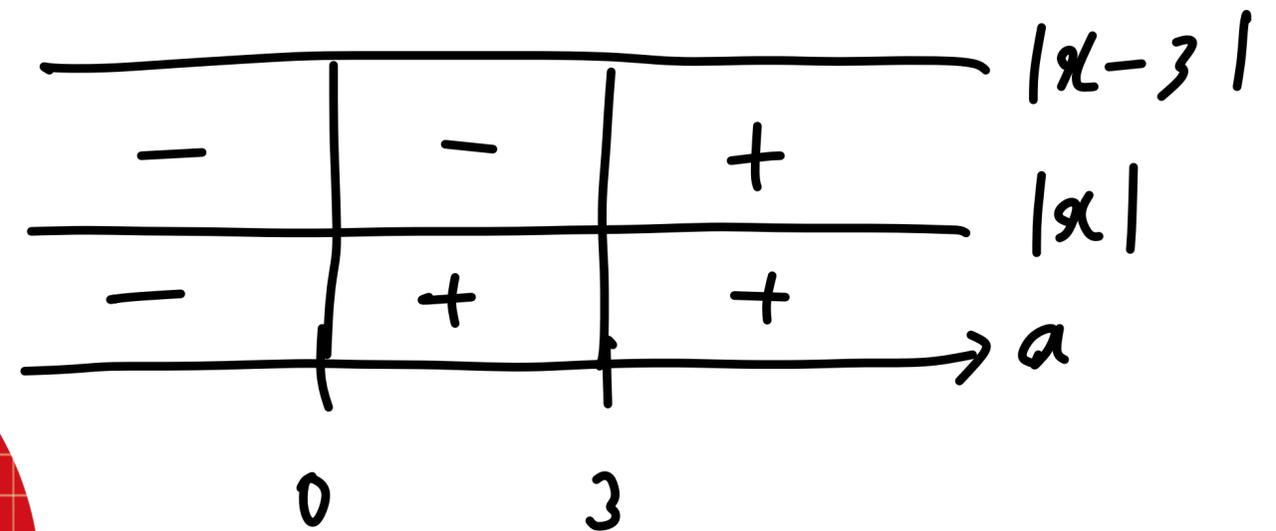
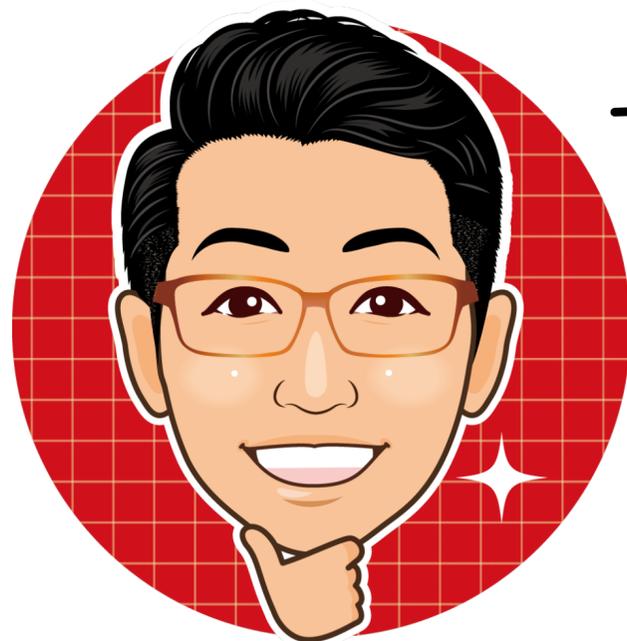
$$x = \frac{1}{2} \text{ (OK)}$$

(i), (ii) より $x = \frac{1}{2}$

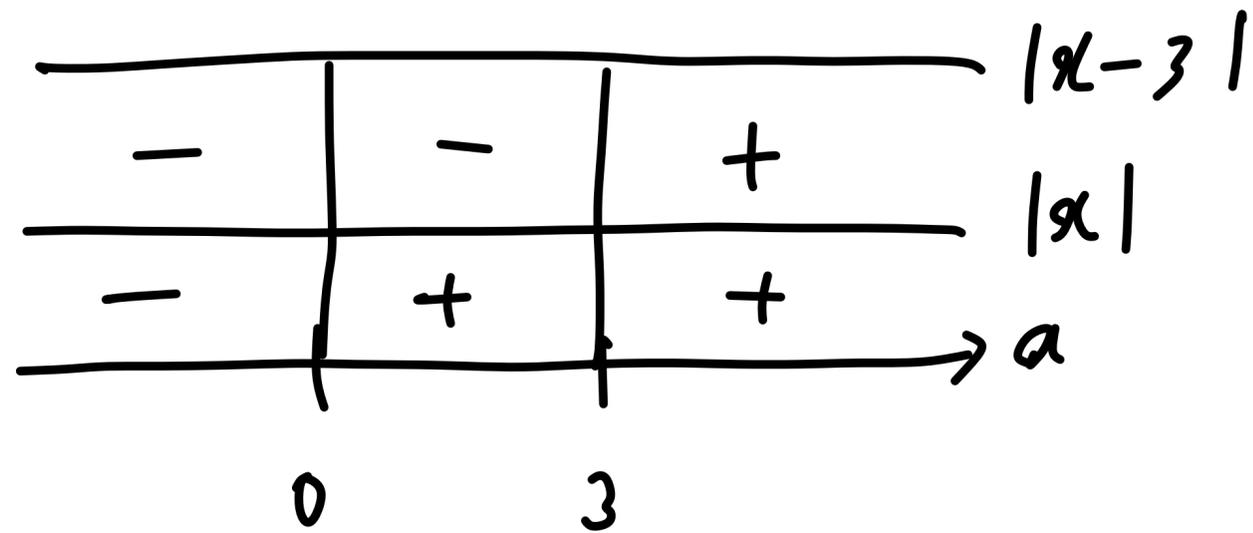


$$(2) \quad |x| + |x-3| = 5$$

$$|x| = \begin{cases} x \geq 0 & \text{or} \quad x \\ x < 0 & \text{or} \quad -x \end{cases}, \quad |x-3| = \begin{cases} x \geq 3 & \text{or} \quad x-3 \\ x < 3 & \text{or} \quad -(x-3) \end{cases}$$


 \Rightarrow


$$(2) \quad |x| + |x-3| = 5$$



$$(i) \quad x \leq 0 \text{ and } x < 3$$

$$-x - (x-3) = 5$$

$$-x - x + 3 = 5$$

$$\underline{\underline{x = -1}}$$



$$(ii) \quad 0 < x \leq 3 \text{ and } x < 3$$

$$x - (x-3) = 5$$

$$3 = 5 \quad \underline{\underline{\text{不通}}}$$

$$(iii) \quad x > 3 \text{ and } x < 3$$

$$x + x - 3 = 5$$

$$\underline{\underline{x = 4}}$$

(i), (ii), (iii) 均

$$\underline{\underline{x = -1, 4}}$$