Save the row vector X with 24 equally speced elements
form -5 to 7

A. Calculate $Y = \sqrt{2}X$

B. From Y delete the elements
having indexes that are multiple of 3

C. Create Z with equally spaced elements form
1 to 16 step 1

D. Calculate, if possible, $V = Y + Z$

E. Let $f(x) = \dfrac{\sqrt[3]{2x^2 - 3}}{0.2x}$, calculate $W = f(Z)$

$$A = \begin{bmatrix} 1 & -1 & 3 \end{bmatrix}$$

$$f(A) = f\left(\begin{bmatrix} 1 & -1 & 3 \end{bmatrix}\right) =$$

$$= \begin{bmatrix} f(1) & f(-1) & f(3) \end{bmatrix} =$$

$$= \begin{bmatrix} \dfrac{\sqrt[3]{2 \cdot 1^2 - 3}}{0.2 \cdot 1} & \dfrac{\sqrt[3]{2 \cdot (-1)^2 - 3}}{0.2 \cdot (-1)} & \dfrac{\sqrt[3]{2 \cdot 3^2 - 3}}{0.2 \cdot 3} \end{bmatrix} =$$

$$= \begin{bmatrix} -\dfrac{1}{0.2} & \dfrac{1}{0.2} & \dfrac{\sqrt[3]{15}}{0.6} \end{bmatrix}$$

$$\sqrt[3]{a} = a^{\frac{1}{3}}$$

1.2 Save the column vector A with equally speced elements form 9 to -18 step-0,5 and the row vector B with elements (7,-1,3,5,8,e).

A. Which is the dimension of A?

B. Substitute the 10th element of A with -3

C. Transform the row vector B into the column vector $B1$

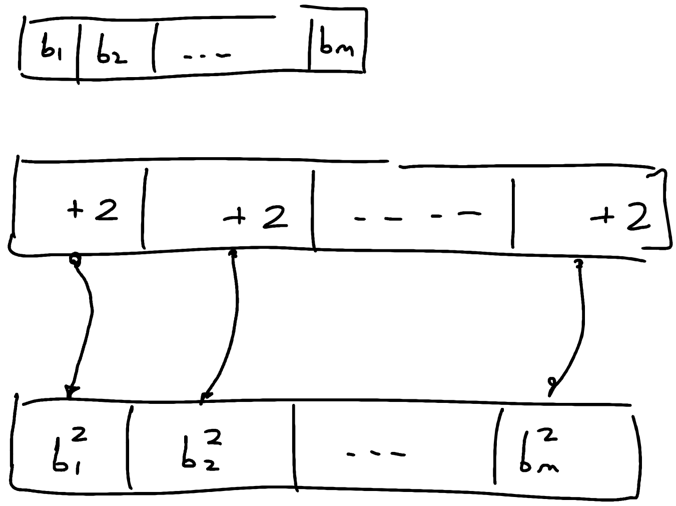
D. Let $f(x) = e^{\frac{|x+2|}{x^2}}$, calculate $C = f(\mathrm{B1})$

E. Let $f(x) = \sqrt[3]{x} - 3$, calculate $D = f(A)$

$$y = \exp(x) = e^x$$

$$e = e^1 = \exp(1)$$

B1



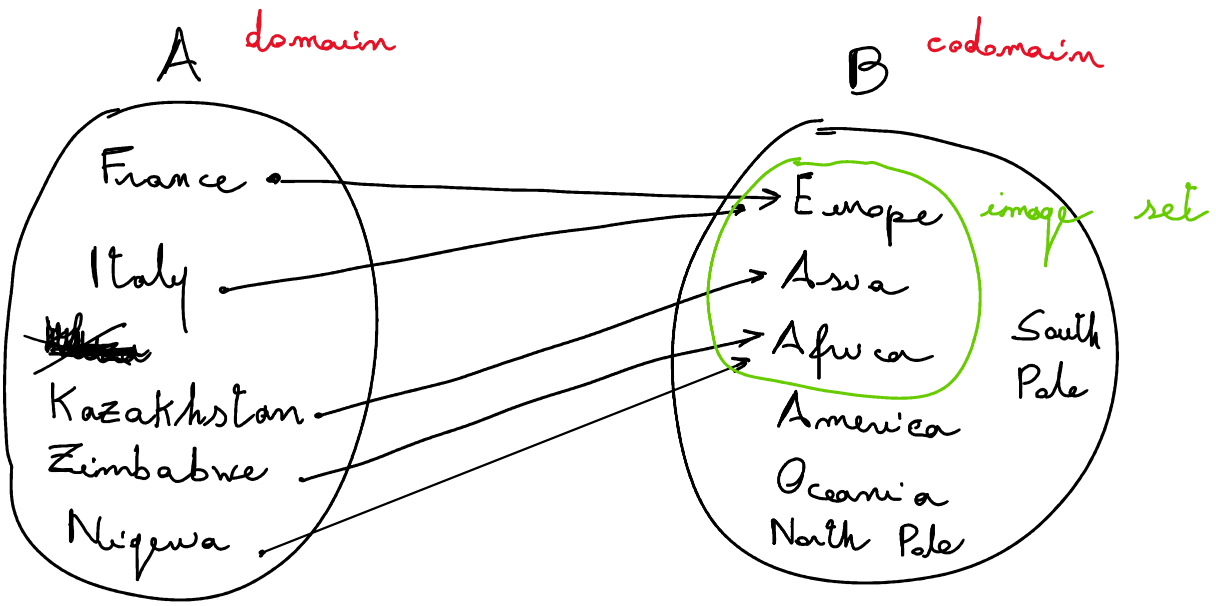
| | absolute value

↳ it's the number without its sign

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

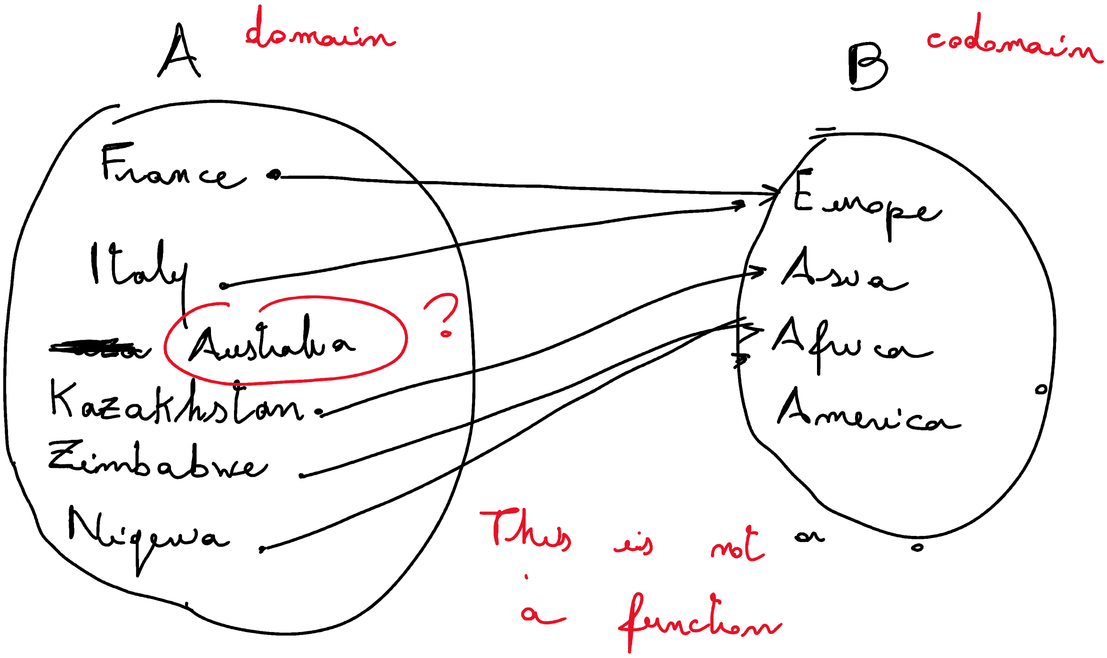
5 $\qquad |5| = 5$

-4 $\qquad |-4| = -(-4) = 4$

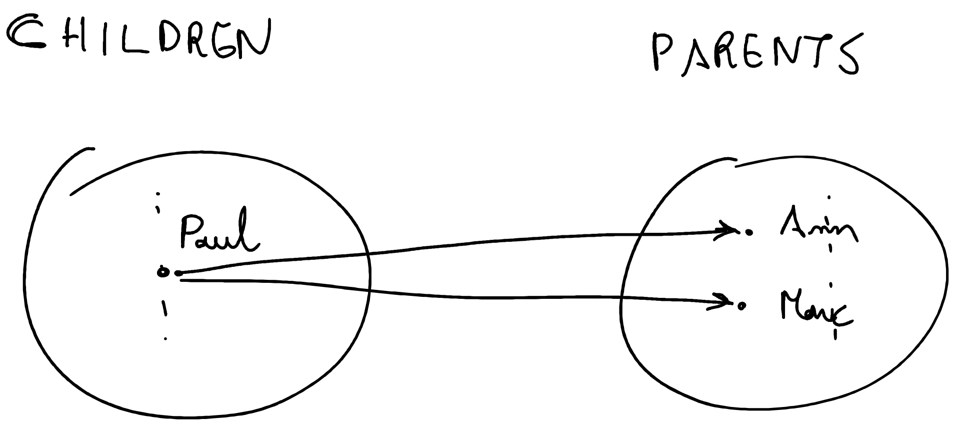


f: is a function that assigns to each state in set A its continent in B

$$f(\text{France}) = \text{Europe}$$



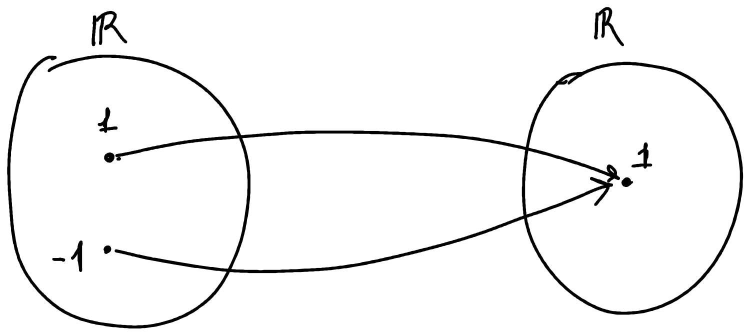
Also, you assign each element in the domain only to one element in the codomain



This is not a function as well

A function $f : A \to B$ is a rule (or law) that assigns to <u>each</u> element in A one and only one element in B.

$$y = x^2$$



Homeworks

Determine domain, codomain and image sets of the following functions.

- $y = \sqrt{(x+2)}$,
- $z = \ln(y - x^2)$ and $z = \sqrt{(y - x)}$.
- $y = e^{x_1} \ln(x_1(x_2 + x_3 + 1)^2)$.

$$f(x) = \sqrt{x+2}$$

$$x + 2 \geqslant 0$$

$$x \geq -2$$

$$\text{dom } f = \{x \in \mathbb{R} : x \geq -2\}$$

$$f(x) = \sqrt{x - y + 2}$$

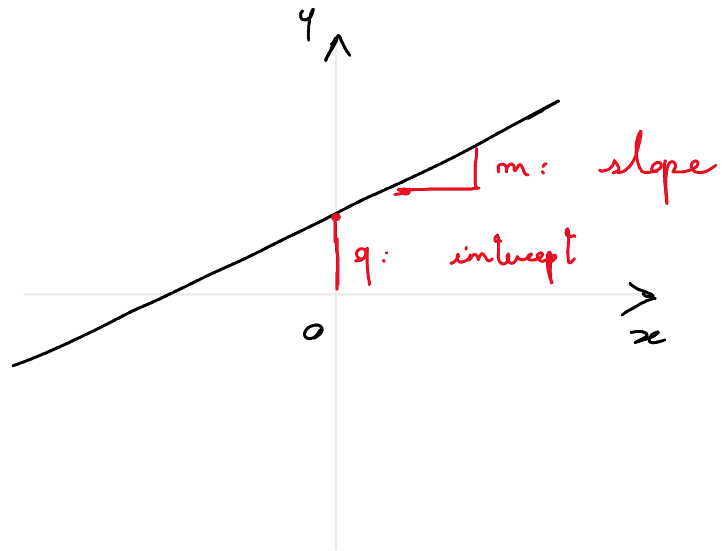
$$x - y + 2 \geq 0$$

① release the inequality

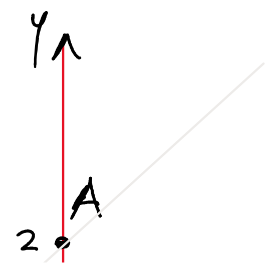
$$x - y + 2 = 0$$

$$ax + by + c = 0 \qquad \text{implicit form}$$

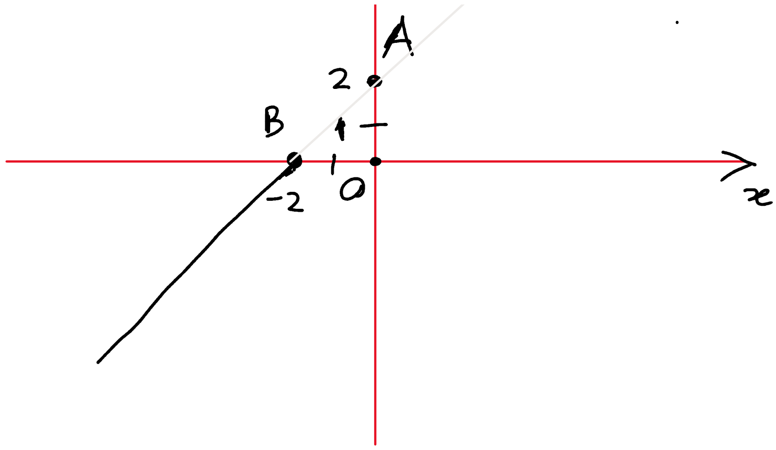
$$y = mx + q \qquad \text{explicit form}$$



② draw



$$x - y + 2 = 0$$



$$x - y + 2 = 0$$

Choose two "comfortable" points:

If $x = 0$ $\qquad 0 - y + 2 = 0 \qquad y = 2$

$A(0, 2)$

If $y = 0$ $\qquad x - 0 + 2 = 0 \qquad x = -2$

$B(-2, 0)$

All the the points in the white line satisfy the equation $x - y + 2 = 0$.

But then all the points that are not in the white line DO NOT satisfy this equation.

This means that, for these points either is

$$x - y + 2 < 0 \quad \text{or} \quad x - y + 2 > 0$$

So the original inequality $x - y + 2 \geq 0$ represents a half plane with the border $x - y + 2 = 0$.

To determine the correct half plane

③ choose a test point that is not on the border (i.e., on the line).

For example the point:

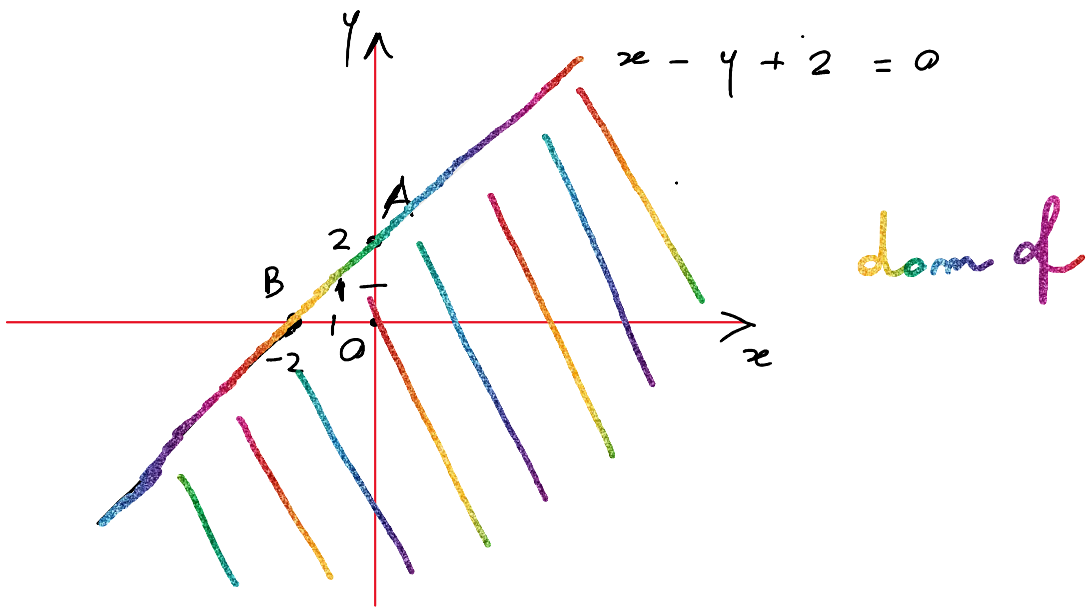
the border (i.e., on the line).

For example the origin

$$x - y + 2 \geq 0$$

$$0 - 0 + 2 \geq 0$$

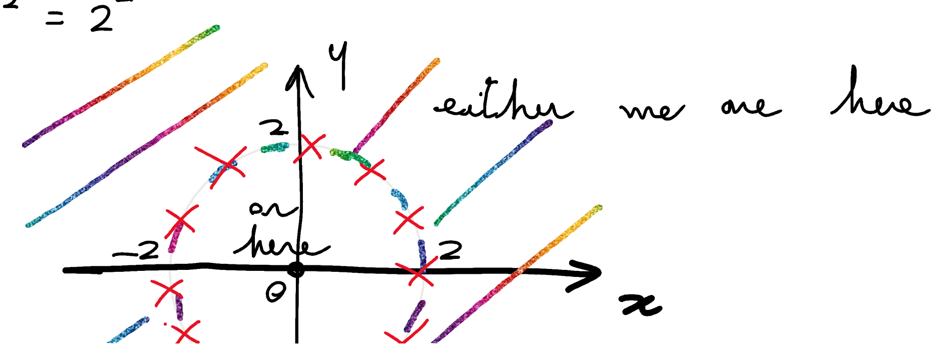
$2 \geq 0$ since the inequality is satisfied, the "correct" half plane is the one containing the origin.

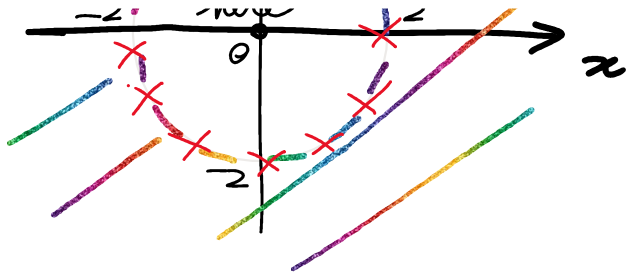


$$x^2 + y^2 > 4$$

(1) $x^2 + y^2 = 4$

$x^2 + y^2 = 2^2$





② choose $(0,0)$

$x^2 + y^2 > 4$

$0^2 + 0^2 > 4$

$0 > 4$ No