Representing Functions

0.1

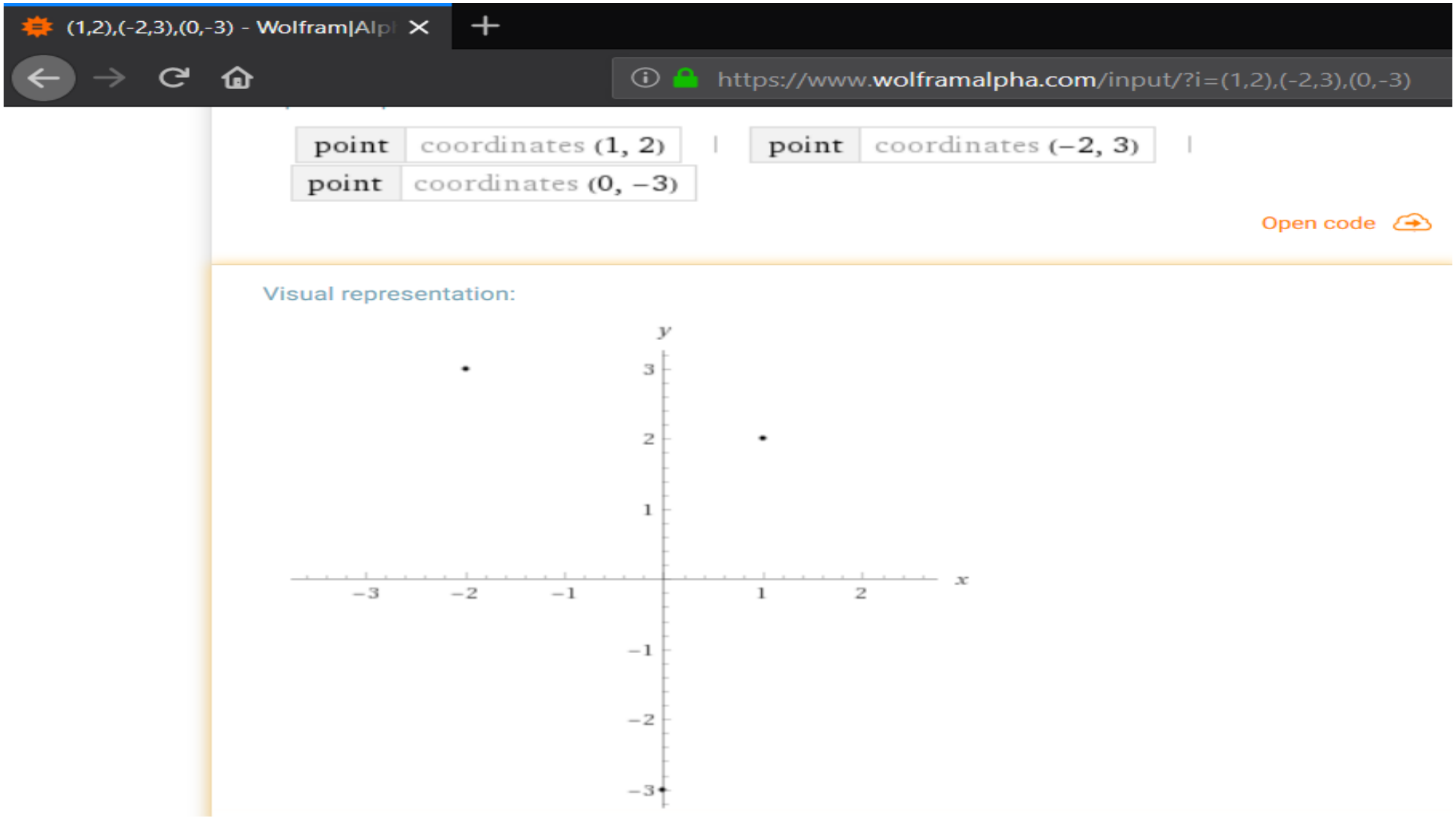
- **Relation**
  - Set of ordered pairs
  - Traditionally we use (x,y)
- **domain**
  - Set of all possible x-values (x-coordinates) from the ordered pairs of a relation
- **range**
  - Set of all possible y-values (x-coordinates) from the ordered pairs of a relation
- **Example-**
  - Given the relation {(-3, 3), (0, -7), (1, -5), (2,4)}
    - (draw the domain and range)
  - State the domain and range-
    - Order your values from least to greatest
  - Domain
    - {-3, 0, 1, 2}
  - Range
    - {-7, -5, 3}

- Coordinate Plane (draw the plane)
  - Formed by the perpendicular intersection of the x-axis (horizontal axis) and the y-axis (vertical axis)
  - Intersection point is the origin (0, 0)
  - Creates 4 quadrants
  - Relations can be graphed on the coordinate plane
- Examples (draw on board)
  - In what quadrant is the point A(2, 3) located?
    - I
  - In what quadrant is the point B(-4, -6) located?
    - III
  - In what quadrant is the point C(3, -4) located?
    - IV
  - In what quadrant is the point D(-8, 5) located?
    - II

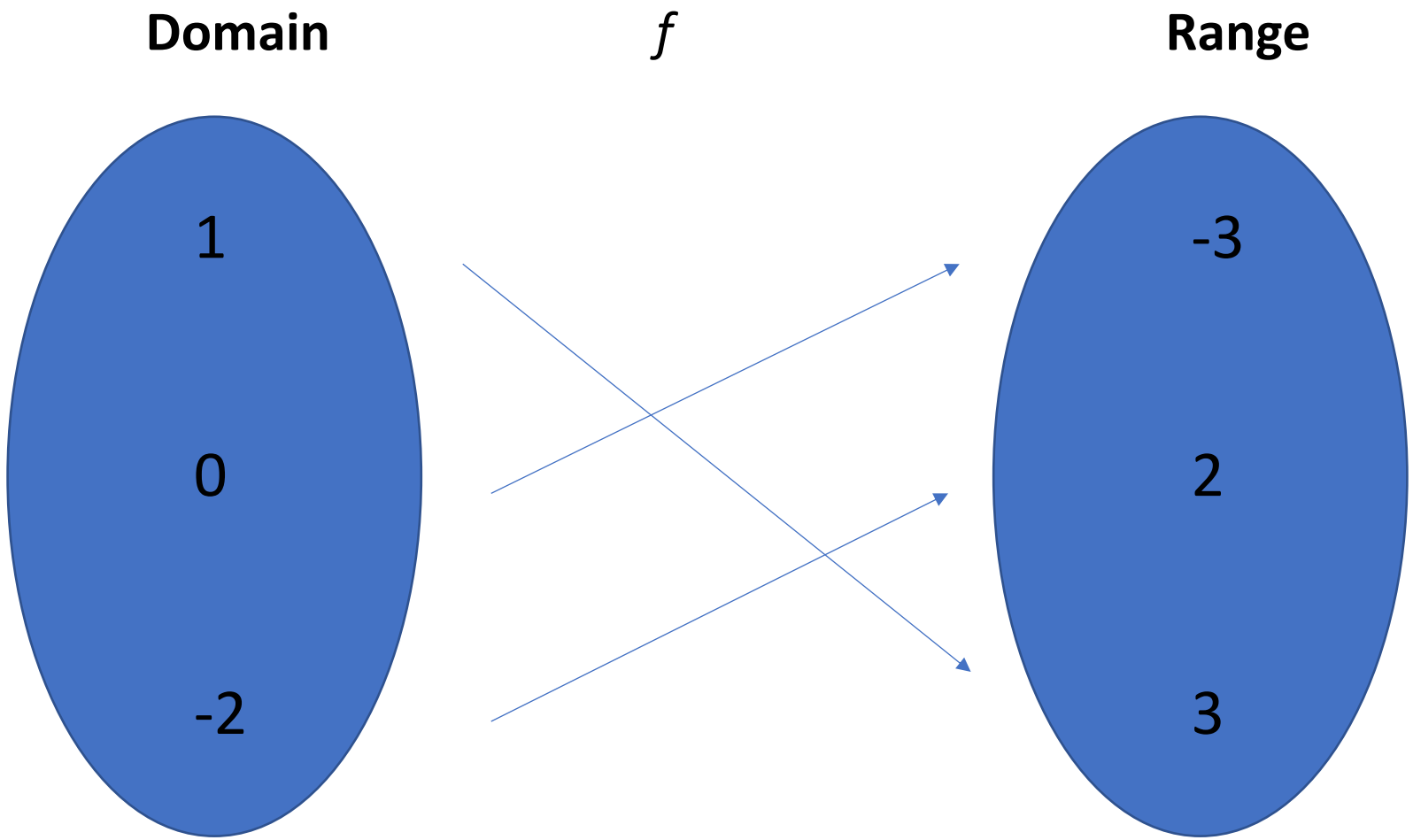
- 4 ways to represent a fct
  I. Ordered pairs
     {(1, 2), (-2, 3), (0,-3)
  2. Table

x	y
1	2
-2	3
0	-3

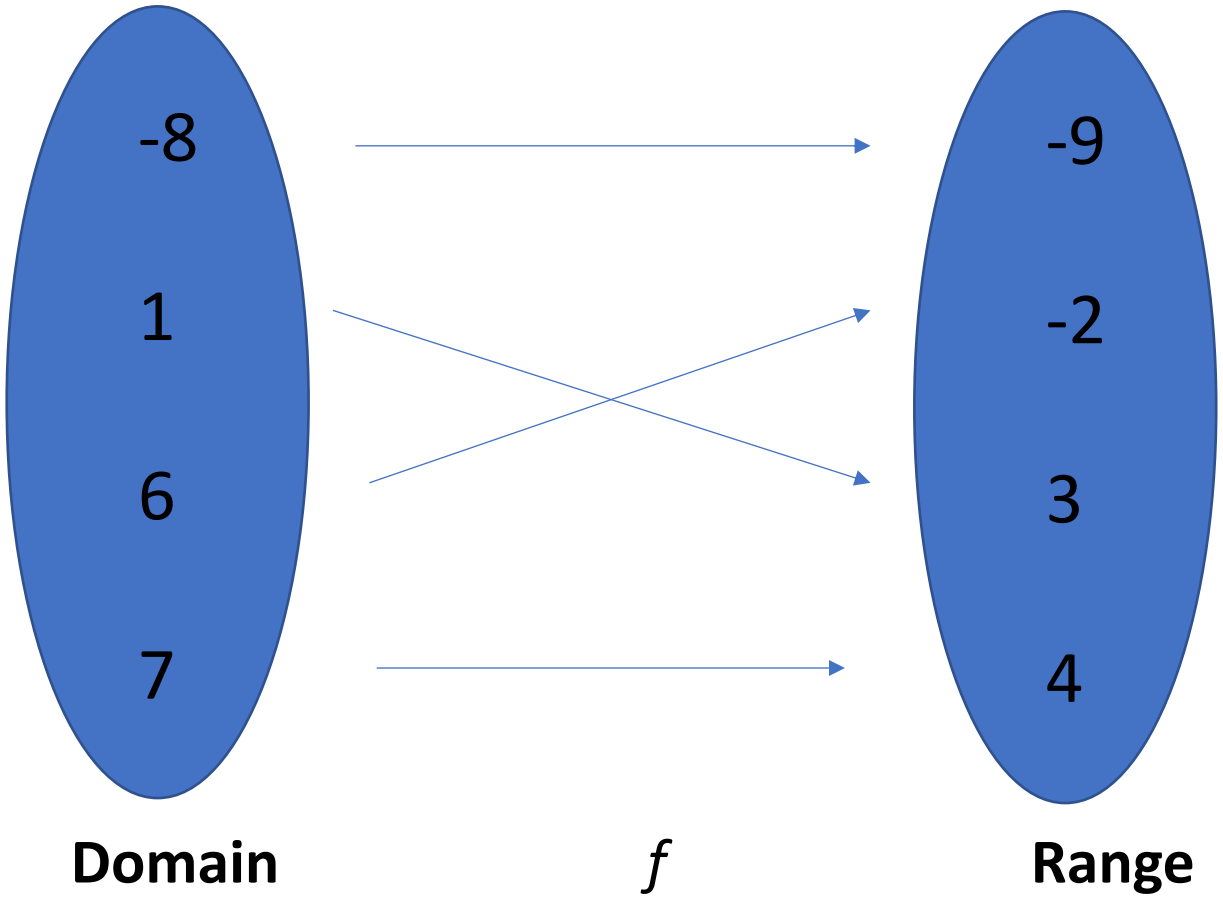
3. Graph


(1,2),(-2,3),(0,-3) - Wolfram|Alp
https://www.wolframalpha.com/input/?i=(1,2),(-2,3),(0,-3)
point coordinates (1, 2)
point coordinates (−2, 3)
point coordinates (0, −3)
Open code
Visual representation:
y
x
3
2
1
−1
−2
−3
−3
−2
−1
1
2

4. Mapping



- Function
  - A relation in which each element of the domain is paired with exactly one element of the range
  - X must be paired with exactly one distinct y
  - A function must pass the Vertical Line Test (**VLT**)
- Examples
  - A) {(1, 3), (6, -2), (7, 4), (-8, -9)}

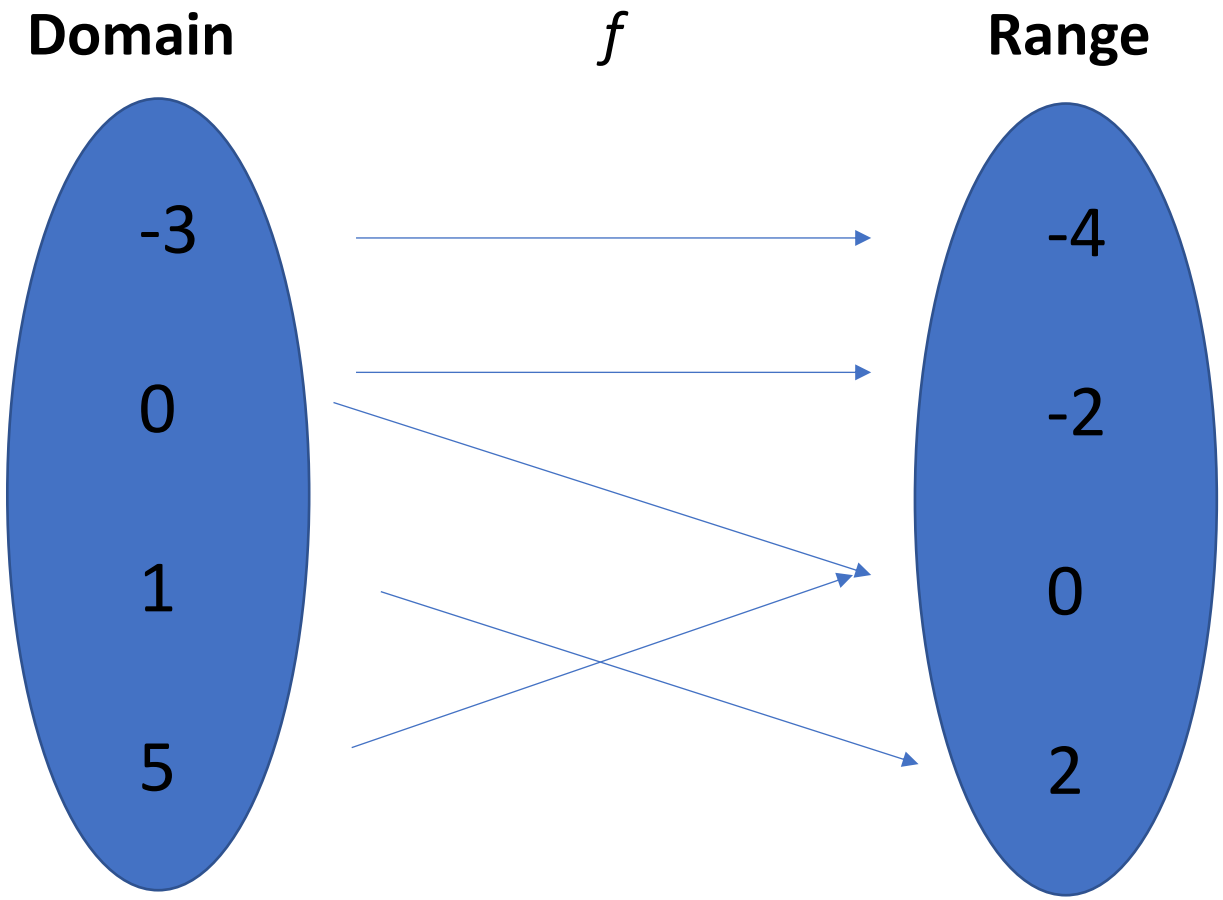


- Example B)

x	y
1	3, 4
2	7
3	4

- Domain:
  - {1, 2, 3}
- Range:
  - {3, 4, 7}
- No, it is not a fct

- Example C)
  - Mapping



  - Domain:
    - {-3, 0, 1, 5}
  - Range:
    - {-4, -2, 0, 2}
  - Fct?
  - No, not a fct
    - Explain on board
    - $f(0) = -2$
    - $f(0) = 0$
    - $0 \in$ Domain
    - $(-2 \neq 0) \wedge \{-2,0\} \subset$ range
    - ∴, f takes a single value from the domain to 2 distinct values in the range
    - ∴, f fails to satisfy the definition of a fct
    - ∴, f is not a fct

- Example D)
- Domain?
  - {-1, 0, 1, 4}
- Range?
  - {-3, -1, 0, 2}
- Fct?
  - Yes, passes VLT