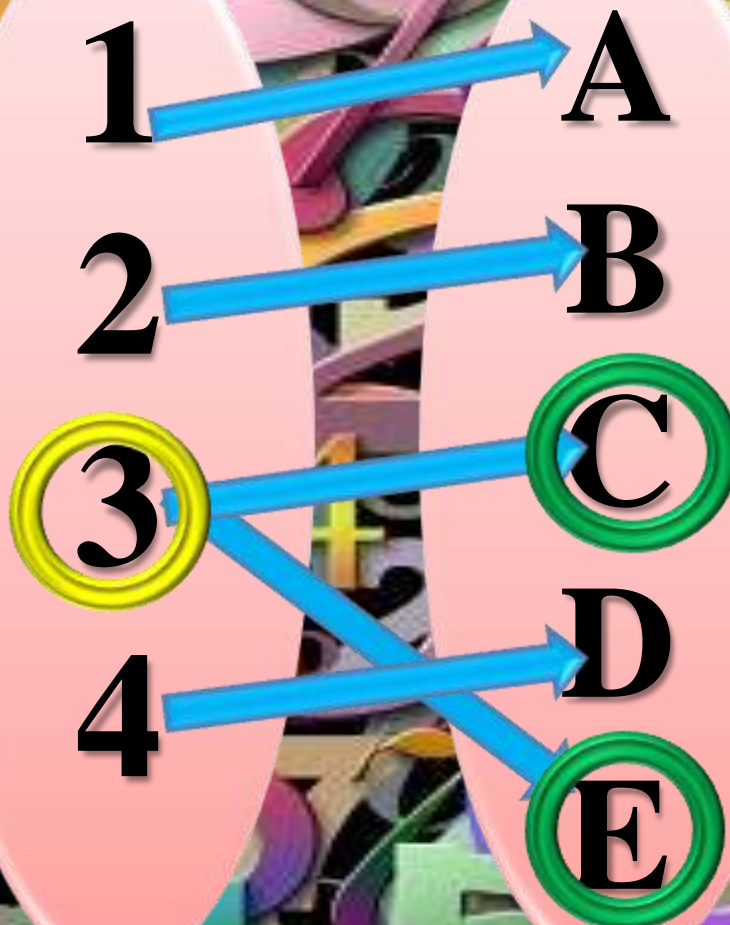


The background of the image is a dense, colorful collage of 3D numbers. The numbers are in various colors including red, yellow, green, blue, and purple, and are arranged in a way that they appear to be floating or scattered. The numbers are of different sizes and are slightly tilted, giving a sense of depth and movement. The overall effect is a vibrant and busy pattern of digits.

Function
Or
Not Function

Domain

Range

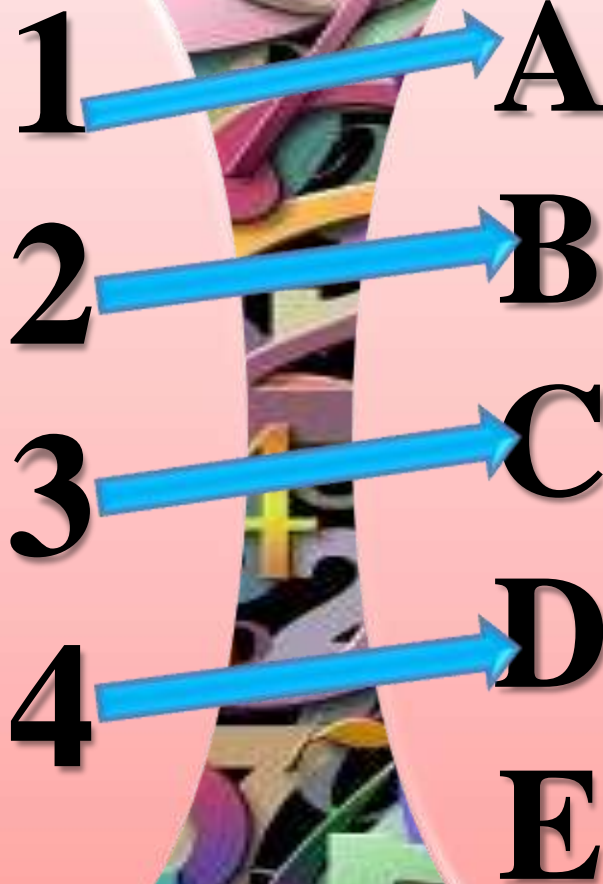


Not
Function

*One
element in
the domain
is paired to
two
elements of
the range*

Domain

Range



Function

*Each
element of
the domain
pairs to
exactly one
element of
the range*

The background of the slide is a dense, colorful collage of 3D numbers. The numbers are in various colors including yellow, orange, green, blue, and purple, and are arranged in a way that they appear to be floating or scattered across the frame. Some numbers are larger than others, and they are all rendered with a 3D effect, giving them a sense of depth and volume. The overall composition is vibrant and visually busy.

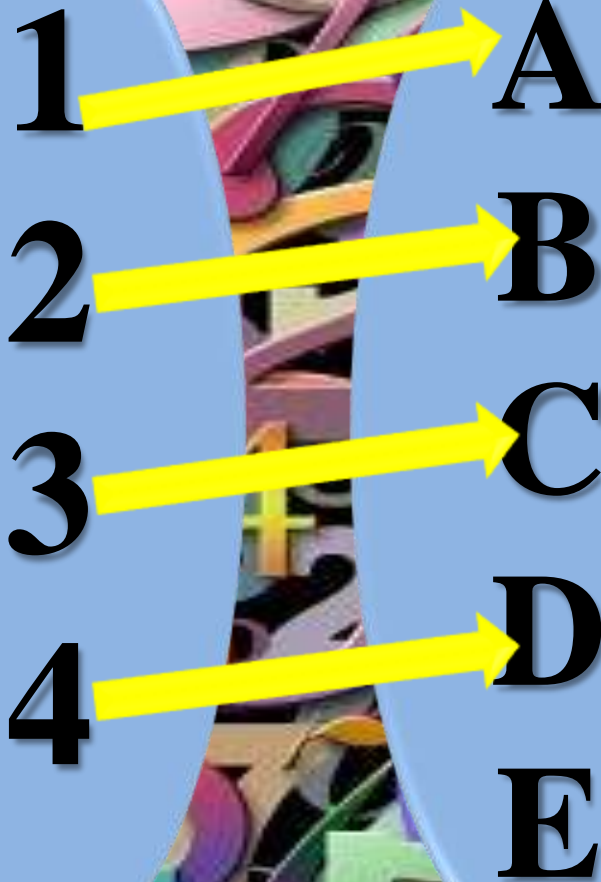
One-to-one

Or

Not one-to-one

Domain

Range

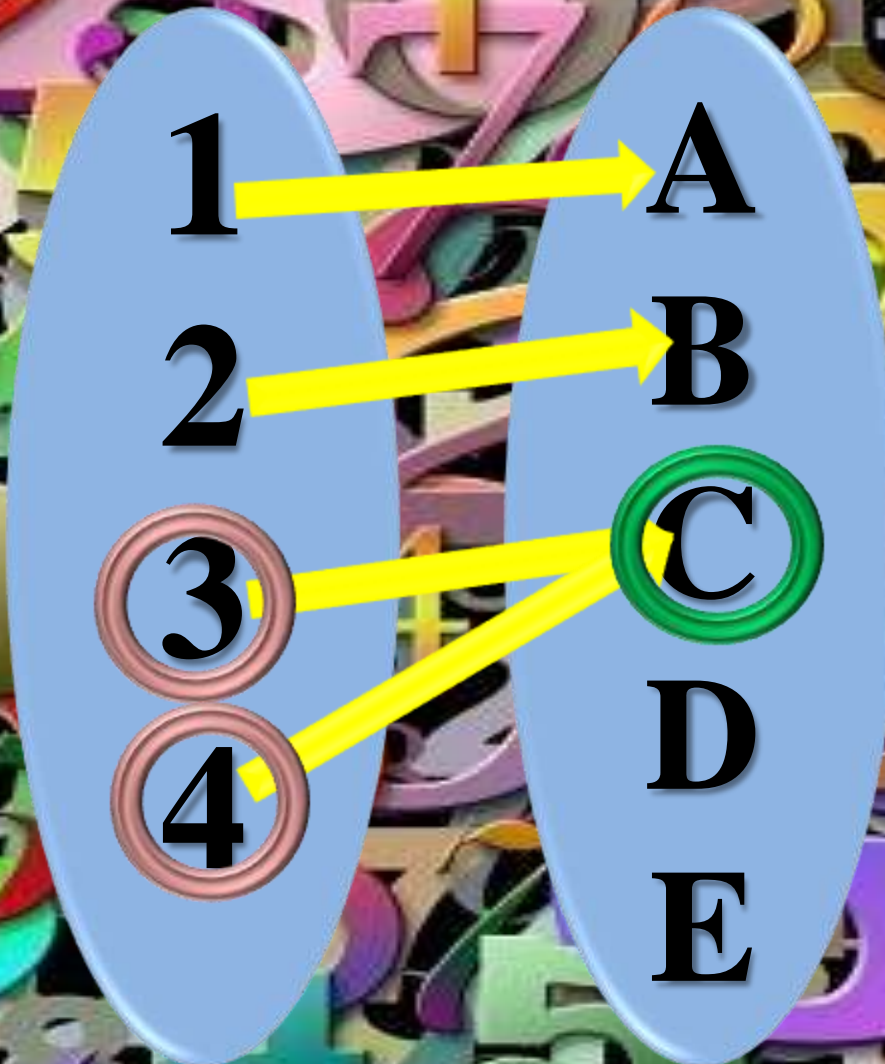


One-to-one Function

*Each
element of
the domain
pairs to
exactly **one**
unique
element of
the range*

Domain

Range

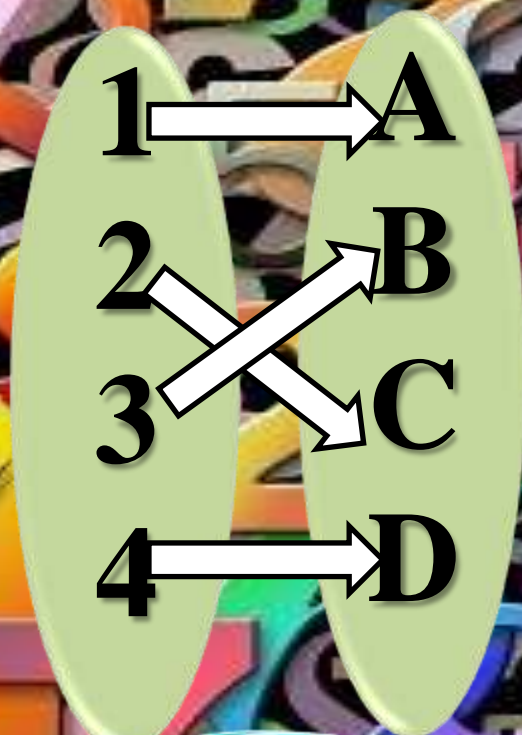
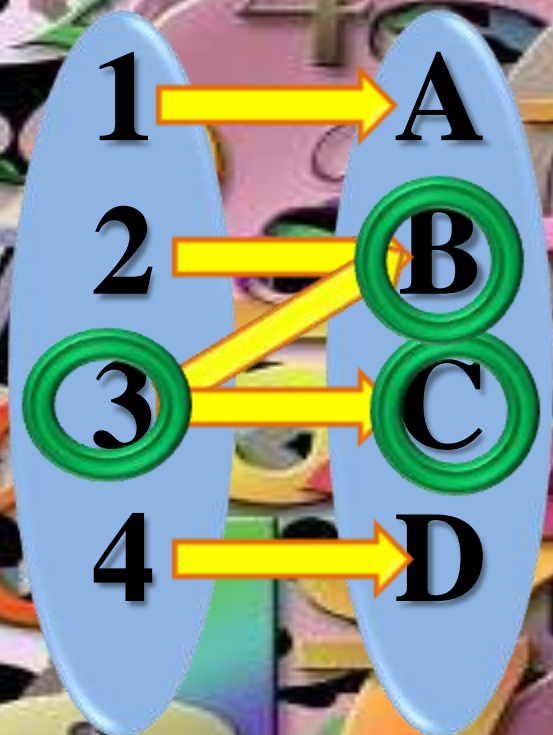


Function

NOT

one-to-one

Two
elements of
the domain
pair to the
same
element of
the range



**Not
Function**

**Function
Not
one-to-
one**

**Function
One-to-
one**

Not Function

$(-6, 2)$

$(0, 3)$

$(3, 2)$

$(2, 1)$

$(6, 0)$

$(-3, -1)$

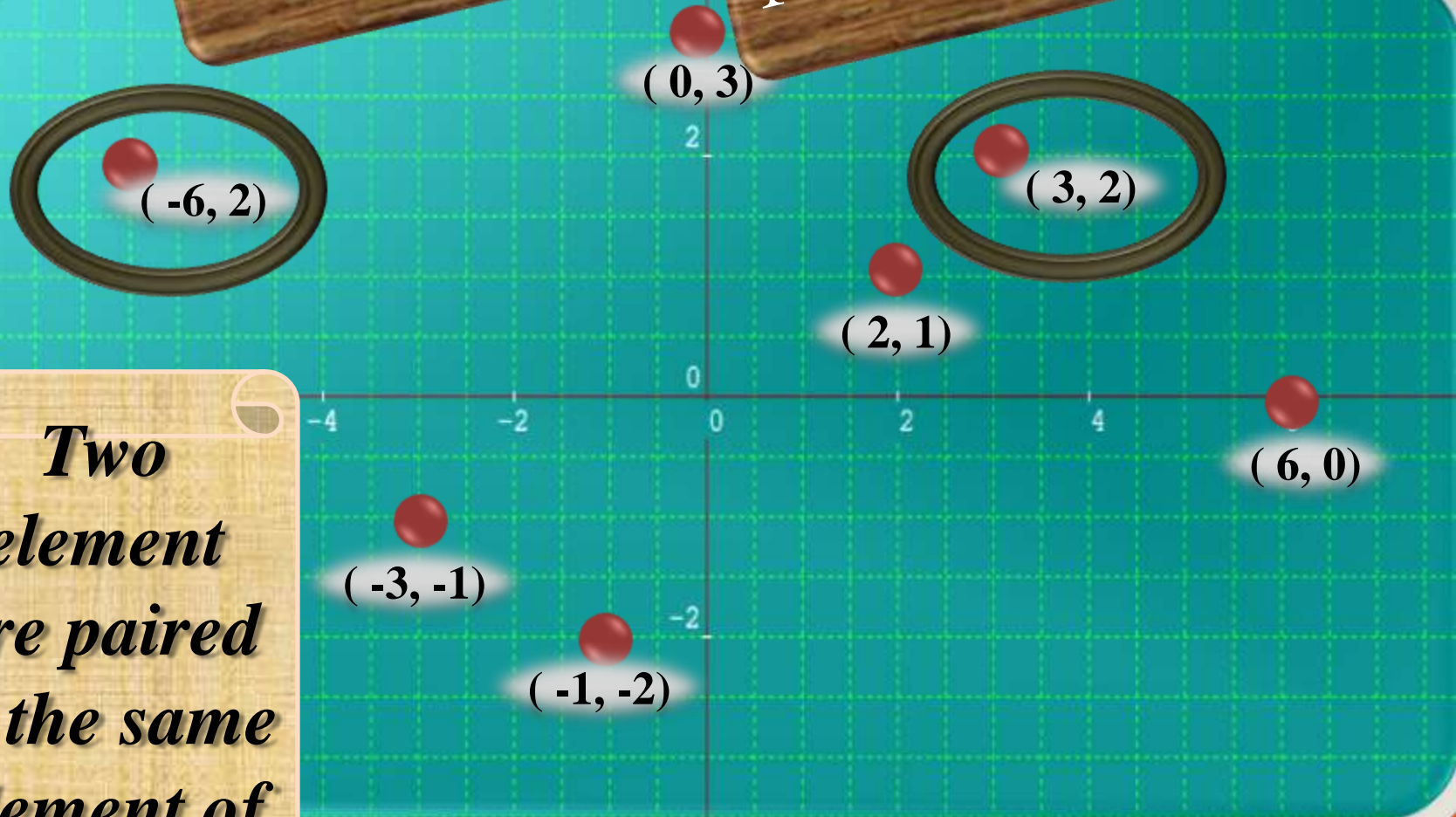
$(-1, -2)$

$(2, -2)$

*One
element is
paired to
two
elements of
the range*

Function

Not one-to-one



*Two
element
are paired
to the same
element of
the range*

Function

One-to-one

$(-6, 2)$

$(0, 3)$

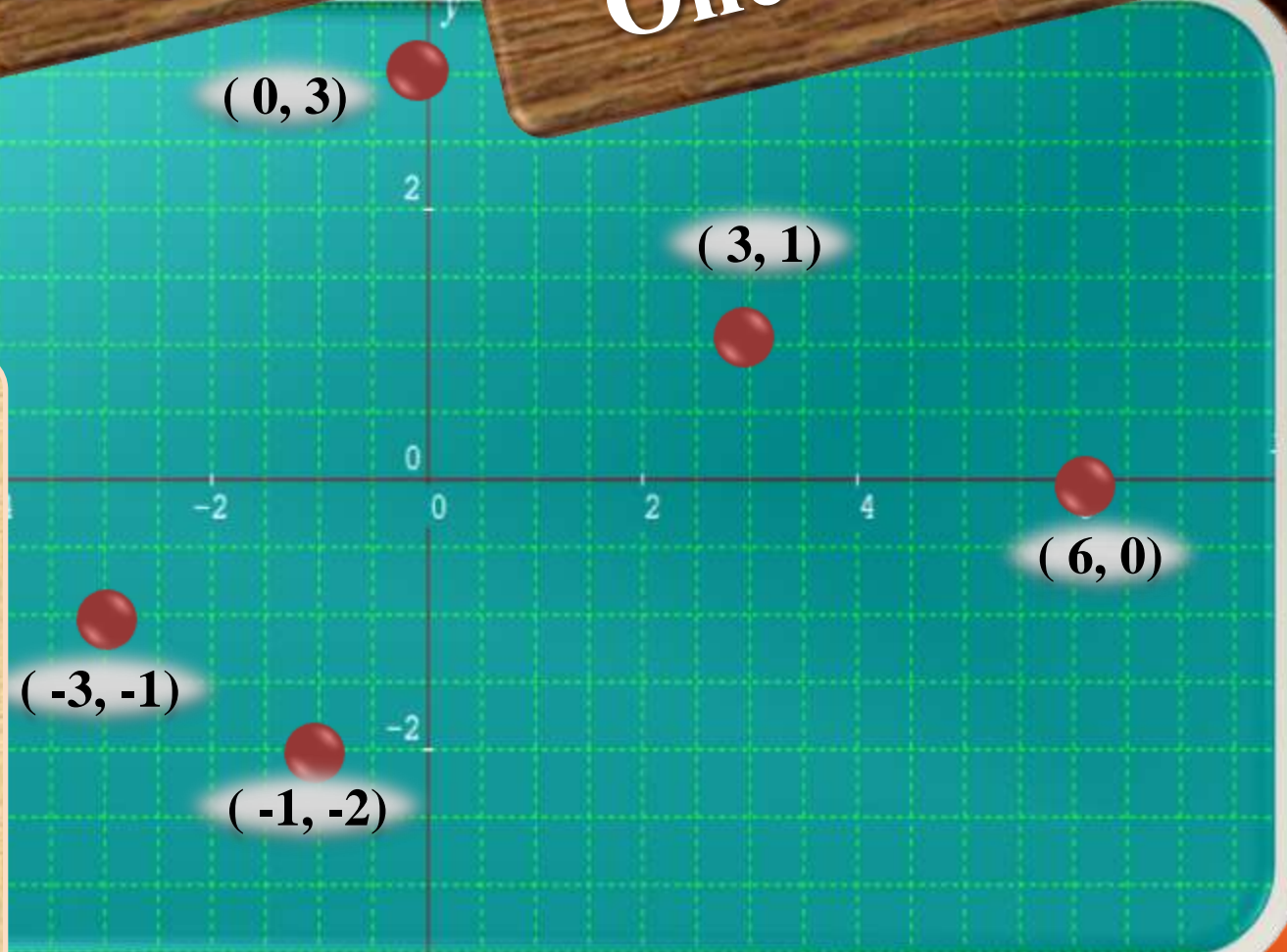
$(3, 1)$

$(6, 0)$

$(-3, -1)$

$(-1, -2)$

*Each
element
pairs to
exactly **one**
unique
element of
the range*

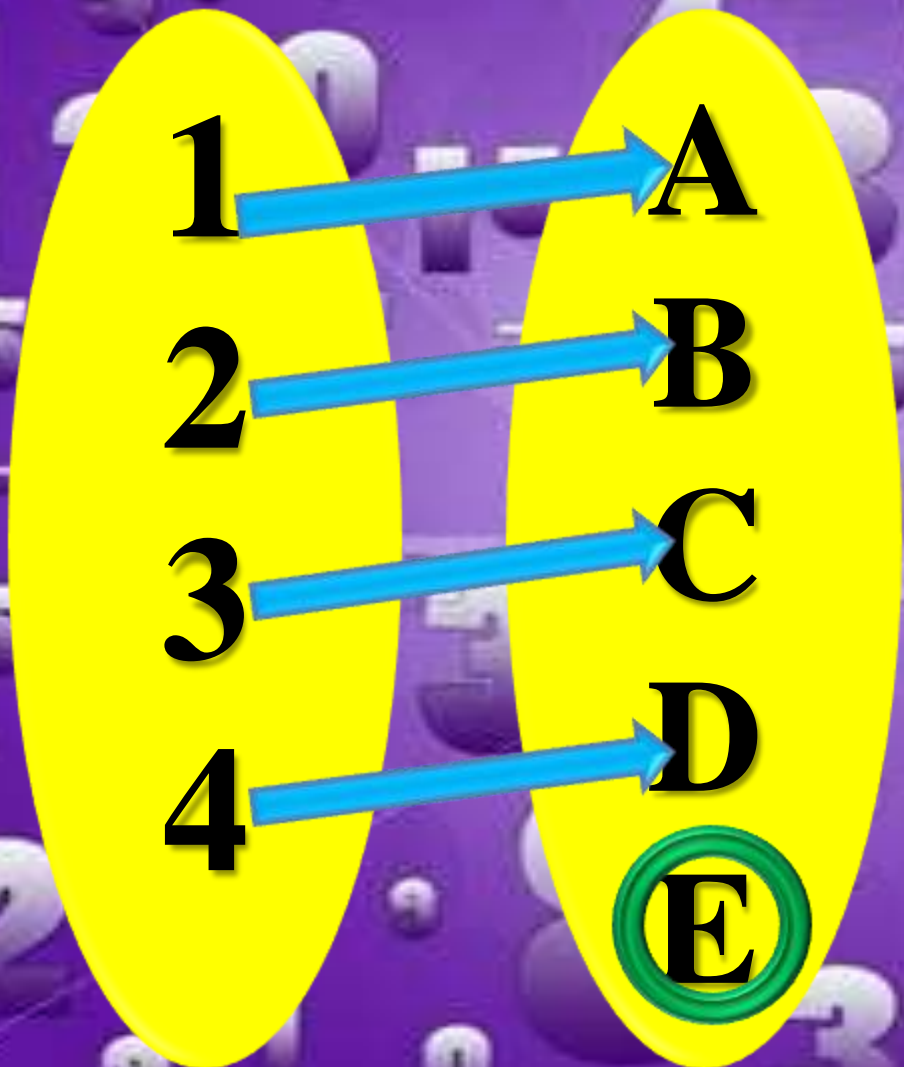


Onto
Or
Not Onto

Domain

Range

1
2
3
4



A
B
C
D
E

Function

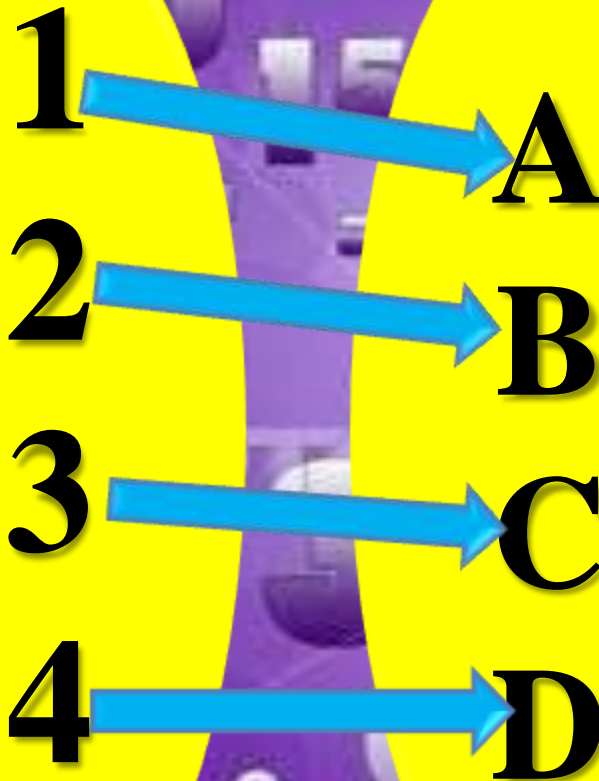
One-to-one

Not Onto

*One element
of the range
does not
correspond to
any element
in the domain*

Domain

Range



Function

One-to-one

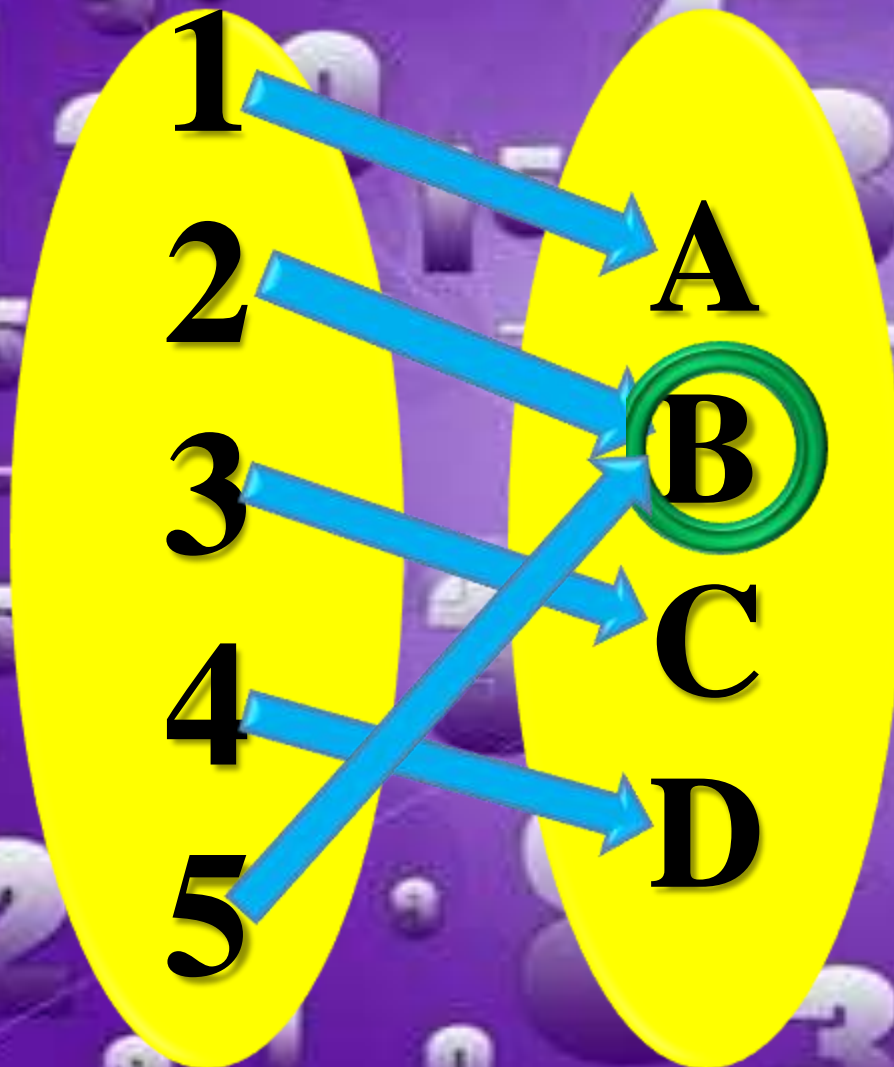
Onto

*Each element
of the range
corresponds
to an element
in the domain*

Domain

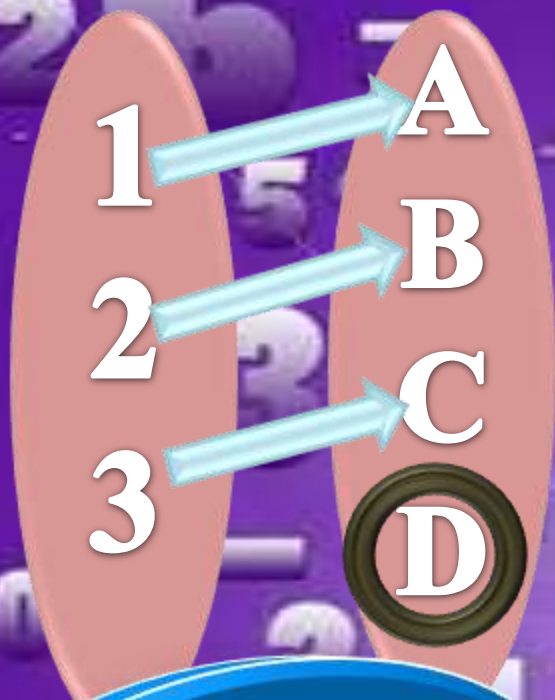
Range

Function

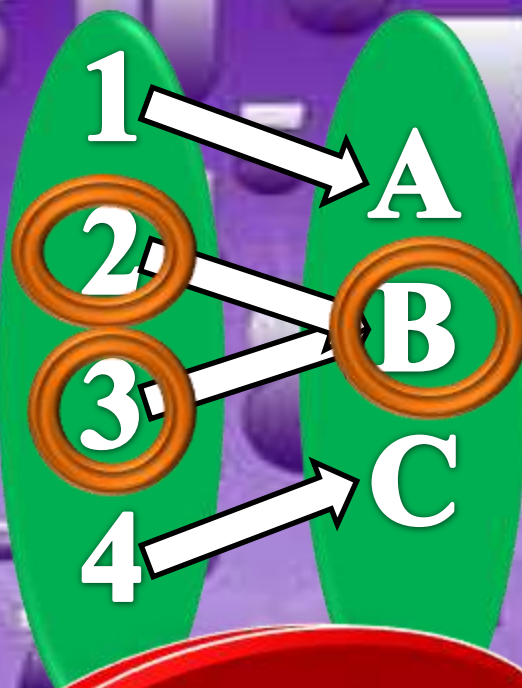


Onto

Not
One-to-
one



Function
One-to-one
Not Onto



Function
Not One-to-one
Onto



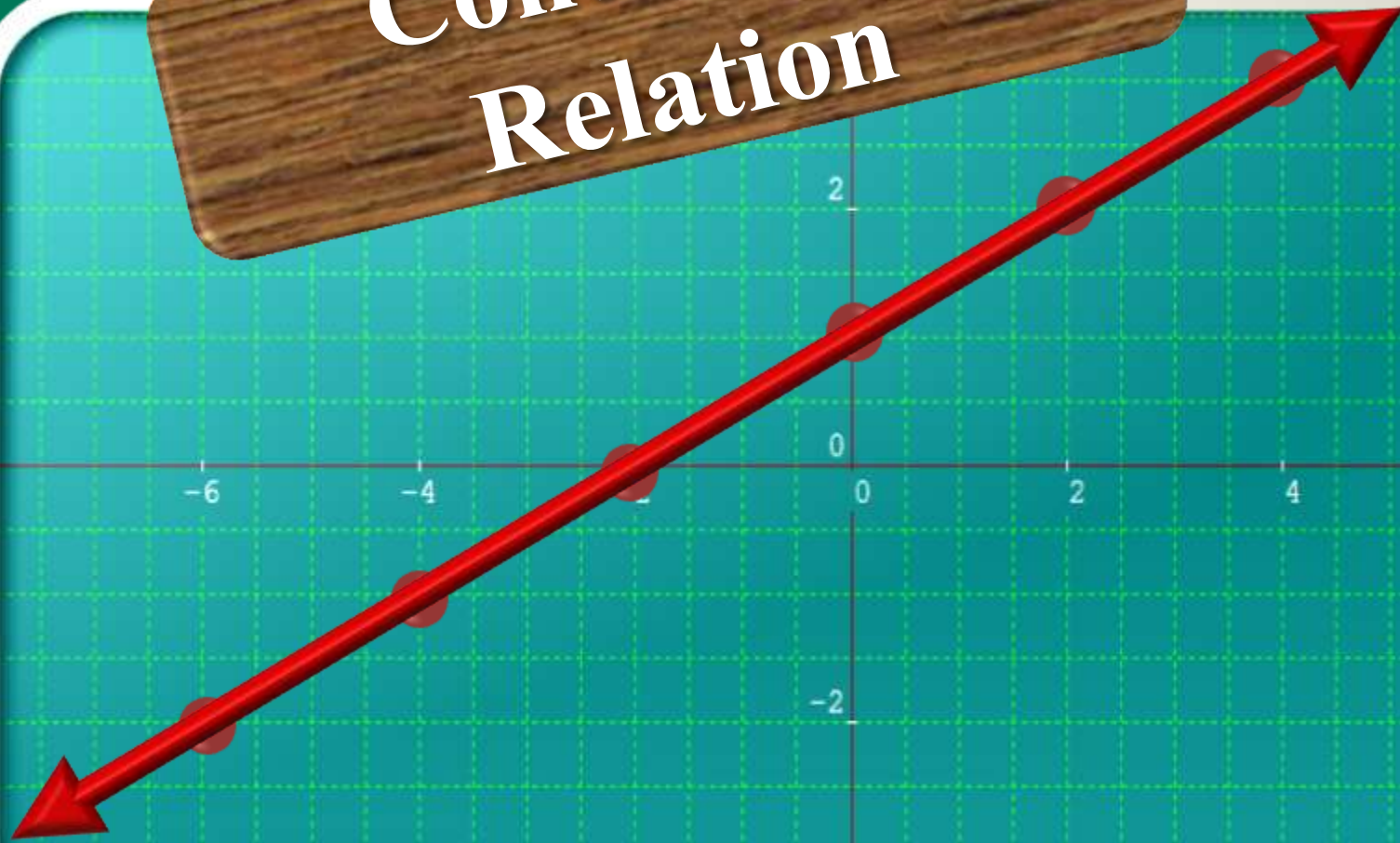
Function
One-to-one
Onto

Discrete Relation

Continuous Relation

Vertical Line Test

Continuous Relation



$$(e^x - e^{-x}) / (e^x + e^{-x})$$

$$y = \cos(x)$$

$$v = u + at$$

$$= \tan(x)$$

$$\operatorname{sech}(x) = 1 / \cosh(x) = 2 / (e^x + e^{-x})$$

$\tan(x)$



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$(e^x - e^{-x}) / (e^x + e^{-x})$

With both discrete
relation

$y = \tan(x)$ $\sech(x) = 1/\cosh(x)$ e^{-x}

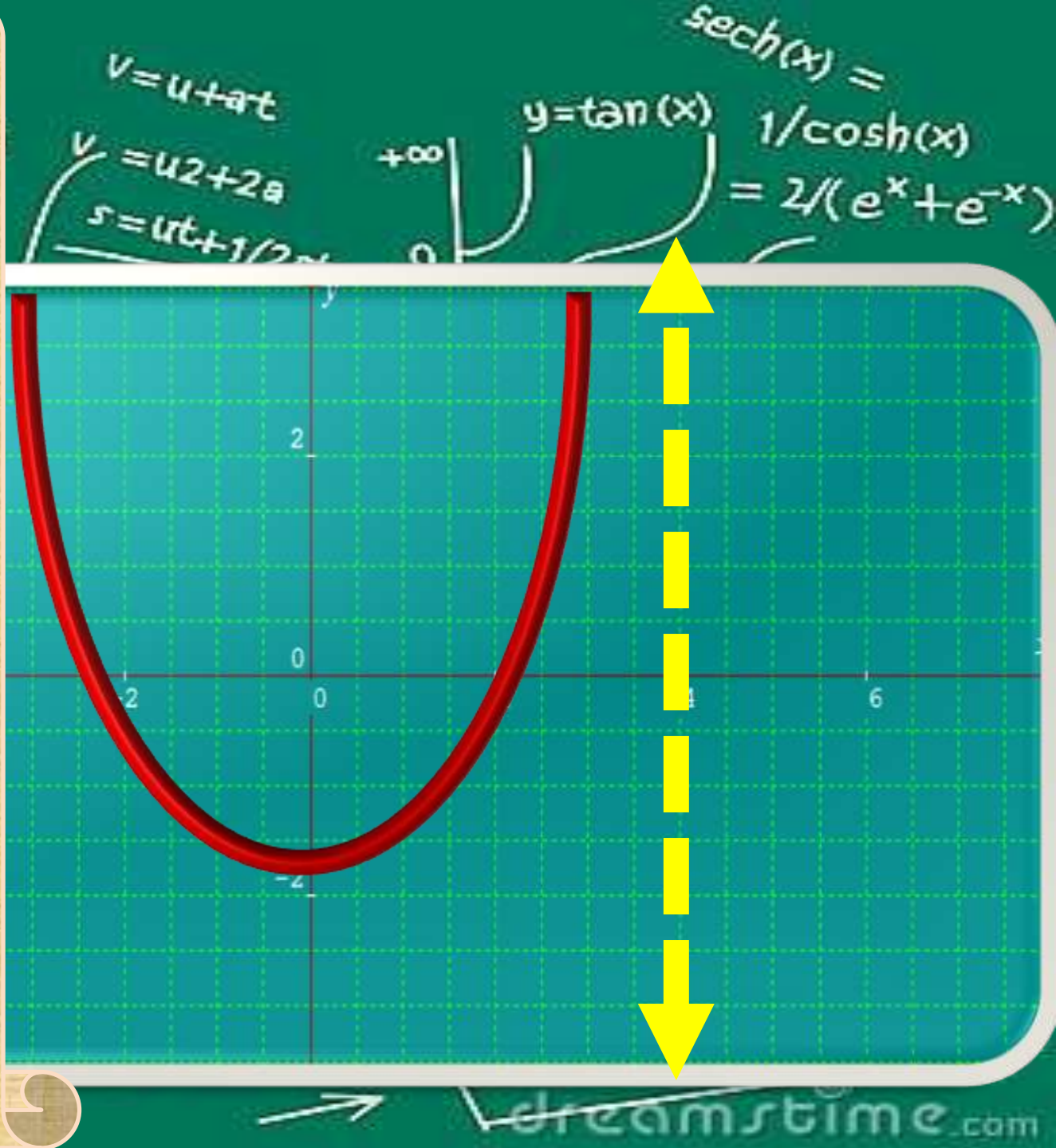
And continuous
relation

You can use
the Vertical
line test

To determine
whether the
relation is a
function

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*If no
vertical line
intersects a
graph **in
more than
one point**,
the graph
represents a
function*



If a vertical line intersects a graph in two or more points, the graph does not represent a function

