J 4: Template (Type in this class template)

Sets and Functions

Activity	Download/Link	Deadline
JOURNAL A. Functions B. Sets C. Venn Diagrams D. Relations	**Journal 4:** Upload pdf **Journal 4:** Accuracy Check quiz	**Friday 26th Nov 5pm**
QUIZ *(100%)* 	Mastery Quiz 4	**Friday 26th Nov 5pm**

A. Functions

Question 1

a. The function f is defined on the real numbers by $\mathbf{f(x) = 2 + x - x^2}$

What is the value of f(-3)?

$f(-3) = 2 + (-3) + (-3)^2 = 4$

b. List the elements of the following sets:

(i) A = {x: x ∈ **N**, 3 < x < 12}	4, 5, 6, 7, 8, 9, 10, 11
(ii) B = {x: x ∈ **N**, x is even, x < 15}	2, 4, 6, 8, 10, 12, 14

B. Set Notation

Question 2

Write the sets and statements below into your journal.

State whether each of the following is **true or false**:

U = {natural numbers}; ***A*** = {2, 4, 6, 8, 10}; ***B*** = {1, 3, 6, 7, 8}

(i) $2 \in A$	*True*
(ii) $11 \in B$	*False*
(iii) $4 \notin B$	*True*

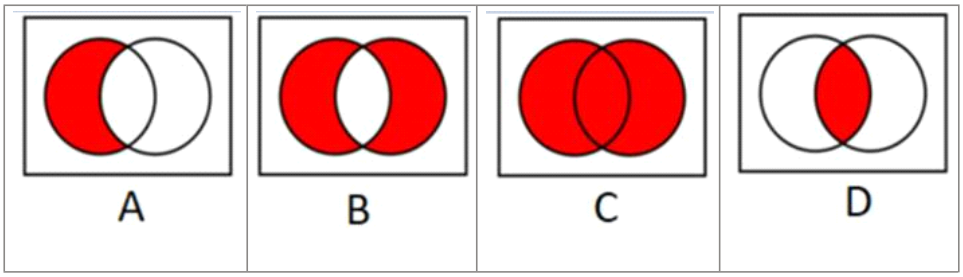
(iv) $A \subseteq \mathbf{U}$	*True*

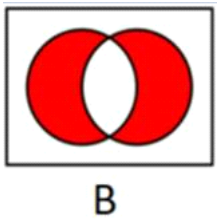
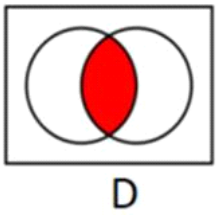
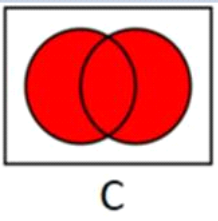
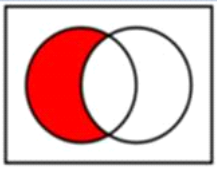
C. Venn Diagrams

Q3. Venn Diagrams

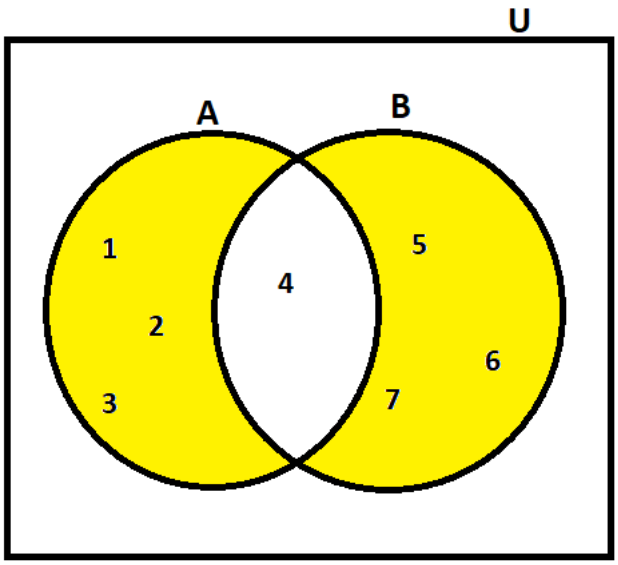
(a) Match the following Set Operation with the appropriate Venn Diagram

Copy and paste the diagram with the set notation below



(i) **A Δ B**	 B
(ii) **A ∩ B**	 D
(iii) **A U B**	 C
(iv) **A - B**	 A

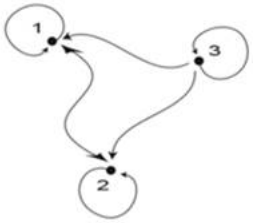
(b) Find the Symmetric Difference **A Δ B**. If A = {1,2,3,4} and B = {4,5,6,7}
Use a Venn Diagram to illustrate your answer (*Hint* *(A-B) U (B-A))*

Solution	Venn Diagram
A-B = {1, 2, 3} **B-A = {5, 6, 7}** **(A-B) U (B-A) = {1, 2 , 3 , 5 , 6 , 7}**	

D. Relations and Diagraphs

Q4.

(a)



(a) State the relation *R* on the set A = {1, 2, 3} as given by the following diagraph.

{(1,2) (2,1) (3,1) (3,2)}

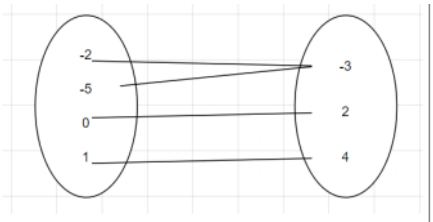
(b) Is the relation R a function?
Explain your answer

R is not a function because the number 3 is related to more than one number.

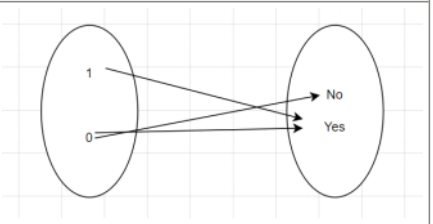
(b)

Determine which of the following is a function by drawing a mapping diagram for each.

(i) T = {(-2, -3), (-5, -3), (0, 2), (1, 4)}



(ii) F = {(1, Yes), (0, No), (0, Yes)}



For the one **that is a function,**

(iii) State the domain and range and Investigate if it is bijective.

Domain = {-2,-5,0,1}
Range= {-3,2,4}

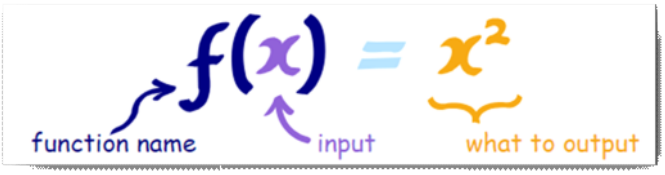
(iv) Explain why or why

is not bijective as each input does not have a unique output.

E. Function: Microbits Application

Q5.

Use the following pseudocode to guide you in creating makecode simulator for this function

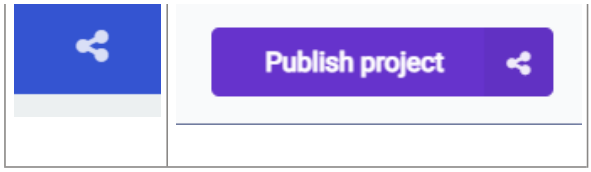


Set up a code to start "x" at 0
then return the value of x^2
then every time you press A it increments "x" by 1 and returns the value

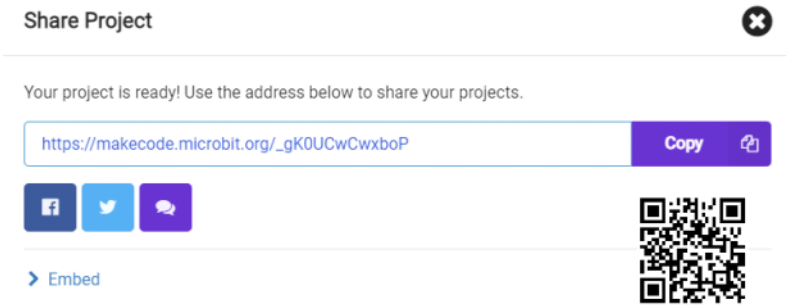
Create and test using Make code project space here

https://makecode.microbit.org/

Use share function and publish project



You can then copy and paste the url into OneNote!



Paste Make code project here

Journal 4