Practice Set

Q1. Let A={1,2,3,4,5}, B={0,1,2,3,5,7,9,12,13} and

i. f_1 = {(1,1), (2,0), (3,7), (4,9), (5,12)}
ii. f_2= {(1,3), (2,3), (3,5), (4,9), (5,9)}
iii. f_3= {(1,1), (2,3), (4,7), (5,12)}
iv. f_4= {(1,1), (2,3), (3,5), (3,7), (4,9)}

Check which of the notation represents a function and write down the range of such function**.**

Q2. Determine the nature (type) of the functions f : R ⟶ R (one-one, onto, one-one onto etc…)

i. f(x)=3x-1
ii. $f(x)=x^2$
iii. $f(x)=x^3$
iv. $f(x)=x^3+1$
v. f(x)=x+1

Q3. Let A={1,2,3} and B={a,b,c,d}. In each case, state whether the given function (if defined) is injective, surjective, bijective.

i. f={(1,a), (2,d), (3,b)}
ii. g={(1,a), (2,a), (3,d)}
iii. h={(1,a), (1,b), (2,d), (3,c)}
iv. j={(1,a), (2,b)}

Q4. A function defined over the set of integers as follows:

$$f(x) = \begin{cases} x & \text{if } 0 \le x < 1 \\ x+2 & \text{if } 1 \le x < 3 \\ 4x-5 & \text{if } 3 \le x < 5 \end{cases}$$

i. Find the domain of f
ii. Find the range of f
iii. State whether f is one-one or many one function.

Q5. Consider A= B= C= R and let f : A⟶B and g : B⟶C be defined by f(x) = x+ 9 and $g(y) = y^2+3$. Find the following composite functions:

i. (fof)(a)
ii. (gog)(a)
iii. (fog)(b)
iv. (gof)(b)
v. (gof)(3)
vi. (fog)(-3)

Q6. Find the inverse function of the following functions f : R⟶R (if exists)

i. $f(x) =x^3$
ii. f(x)=ax+b (a≠0)
iii. $f(x)=x^2+1$

iv. $f(x)=x^2+3$

Q7. If f and g are two functions defined over the sets of real numbers such that $f(x) = x^2$ and $g(x) = \sin x$ for all $x \in R$. Show that $fog \neq gof$.

Q8. Find the domain of the real valued function $f(x) = \sqrt{81 - x^2}$.

Q9. Show that the function $f(x) = x^3$ and $g(x) = x^{1/3}$ for $x \in R$ are inverses of one another.

Q10. Let A={1,2,3,4}and let f = {(1,3), (2,1), (3,4), (4,3)} and g = {(1,2), (2,3), (3,1), (4,1)}. Find

i. fog
ii. gof
iii. fof
iv. gog