

MATHS

ASSIGNMENT CLASS-XI

Relations And Functions

Q1-Determine which of the following is functions. Find domain and range in case of function.

i) $R = \{(1,3)(2,3)(-1,4)(-6,4)\}$

ii) $S = \{(-4,-4)(-1,-1)(0,0)(1,1)(4,4)\}$

iii) $T = \{(x,y): y=2x, x \text{ belongs to } R\}$

iv) $G = \{(-1,-1)(-1,0)(-1,2)(-1,4)\}$

v) $F = \{(x,y): x=y^2, x,y \text{ belongs to } R\}$

Q2-Is $f = \{(1,0)(2,3)(3,6)(4,9)\}$ a function? If this is described by the formula $f(x) = ax + b$, then find the value of a and b .

Q3-If a function $f: R \rightarrow R$ be defined by

$$f(x) = \begin{cases} 3x-2, & x < 0 \\ 1, & x = 0 \\ 4x+1, & x > 0 \end{cases}$$

, then find $f(1), f(-1), f(0)$ and $f(4)$.

Q4-let X be the set of 2 positive integers. let $f: X \rightarrow Z$ (set of positive integers) is defined by $f(x) = k$, where k is the highest prime factor of x . If range of f is $\{3\}$, find set X . Is set X , uniquely determined?

Q5- if f is a real function defined by $f(x) = (x-1)/(x+1)$, then prove that $f(2x) = (3f(x)+1)/(f(x)+3)$.

Q6- find domain of each of the following real valued function.

(i) $f(x) = 1/\sqrt{x^2-1}$

(ii) $f(x) = \sqrt{a^2-x^2}$

(iii) $f(x) = 1/1-\cos x$

(iv) $f(x) = 1/2-\sin 3x$

(v) $f(x) = 1/\sqrt{x-|x|}$

(vi) $f(x) = 1/\sqrt{x-[x]}$

Q7- find the range of the following function given by :-

(i) $f(x) = (3)/(2-x^2)$

(ii) $f(x) = 1-\sqrt{x-2}$

(iii) $f(x) = \sqrt{x-3}$

(iv) $f(x) = 1+3\cos 2x$

Q8- find the domain and range of each of the following real value function :-

(i) $f(x) = (x^2-16)/(x-4)$

(ii) $f(x) = \sqrt{x-1}$

(iii) $f(x) = (\sqrt{x-4})/(x-4)$

(iv) $f(x) = \sqrt{x-[x]}$

Q9- redefine the function

$$f(x) = |x-2| + |2+x|, \quad -3 \leq x \leq 3.$$

Q10- let $f(x) = \frac{ax}{x-1}$, (x is not equal to -1)

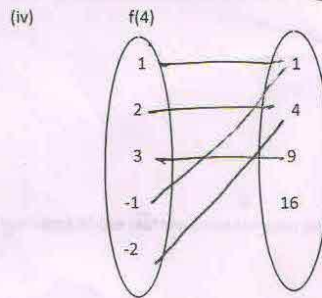
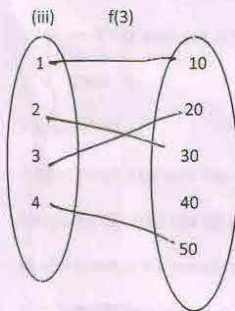
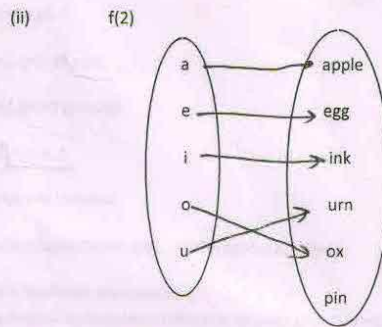
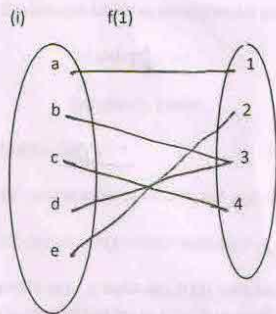
then find the value of a if $f(f(x)) = x$ for all (x is not equal to -1).

Q11- if $f(x) = x + \frac{1}{x}$, prove that

$$[f(x)]^3 = f(x^3) + 3f\left(\frac{1}{x}\right).$$

Q12- if $2f(x) - 3f\left(\frac{1}{x}\right) = x^2$ (x is not equal to 0), then find $f(2)$.

Q13- write the function given by the following diagrams in the order pair form also. write their domain, range and co-domain.



Q14- check whether following relation a function/ justify your answer ?

$$R = \{(2,3), (1/2,0), (2,7), (-4,6)\}$$

Q15- Write total number of function from set A to B ,

where,

(i) $A = \{1, 2, 3\}$, $B = \{a, b, c\}$

(ii) $A = \{1, 2, 3\}$, $B = \{a, b, c, d\}$

(iii) $A = \{1, 2, 3, 4\}$, $B = \{a, b, c\}$

(iv) $A = \{a, e, i, o, u\}$, $B = \{ \alpha, \beta \}$

(v) $A = \{1, 2\}$, $B = \{11, 12\}$

Q16- find the domain for which the function

$f(x) = 2x^2 - 1$ and $g(x) = 1 - 3x$ are equal.

Q17- if $R = \{(x, y), y = 2x + 7, \text{ where } x \text{ belongs to } R \text{ and } -5 \leq x \leq 5\}$ in a relation, find the domain & range of R.

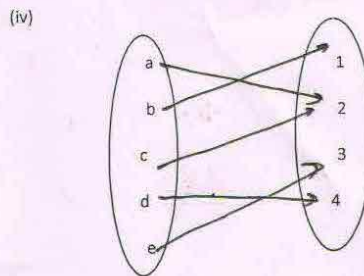
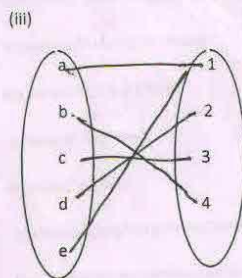
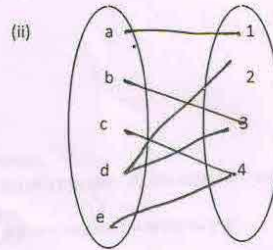
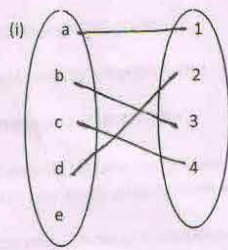
Q18- if $p = \{x : x < 3, x \text{ belongs to } N\}$, $Q = \{x : x \leq 2, x \text{ belongs to } W\}$, find $P \cup Q * P \cap Q$, where W is the set of whole numbers.

Q19- is the given relation a function? Give reason for your answer.

(i) $f = \{(4, 6), (3, 9), (-11, 6), (3, 11)\}$

(ii) $g = \{(n, 1/n) : n \text{ is a positive integer}\}$.

Q20- Check whether the maps in the following diagrams are function or not. If they are, write domain and range also.



LINEAR INEQUALITIES

Q1- SOLVE for real x: $-|2x| < 4$

Q2- SOLVE for real x: $-|2x - 5| > 1$

Q3- A solution is to be kept between 40C and 45C. What is the range of temperature in degree fahrenheit, if the conversion formula is $F = 9/5C + 32$?

Q4-The length of a rectangle is 3 times the breadth, if the minimum perimeter of the rectangle is 60 cm, then find its breadth.

Q5-In drilling world's deepest hole, it was found that the temperature T (in degree celcius), x km below the earth's surface was given by $T=30+25(x-3)$, $3 \leq x \leq 15$. At what depth will the temperature be between 155C and 205C?

Q6-Solve the inequality $-3x+2y \geq -6$ graphically.

Q7-The cost function and revenue function of a product are given by $C(x)=2x+4000$ and $R(x)=60x+2000$ respectively, where x is the no. of items produced and sold. How many items must be sold to realize some profit?

Q8-Find all the pairs of consecutive odd natural numbers, both of which are larger than 10 such that their sum is 40.

Q9-Solve the following inequalities:-

i) $3x-5/5x+7 \leq 3$ ii) $2x+7/4x-5 \geq 7$

Q10-Solve these inequalities graphically:-

i) $2x+y \geq 6, 3x+4y \leq 12, x \geq 0, y \geq 0$

ii) $2x-y > 1, x-2y < -1$

iii) $x+y \leq 9, y > x, x \geq 0$

iv) $5x+4y \leq 20, x \geq 1, y \geq 2$

v) $2x+y \geq 4, x+y \leq 3, 2x-3y \leq 6$

vi) $x-2y \leq 3, 3x+4y \geq 12, x \geq 0, y \geq 1$

Q11-Solve $|5-2x| < 1$, x belongs to \mathbb{R} and represent the solution set on number line.

Q12-How many litres of water will have to be added to 1125 litres of the 45% solution of acid so that the resulting mixture will contain more than 25% but less than 30% acid content?

Q13-Solve the inequality:-

i) $|2/|x-4| > 1, x \text{ not equal to } 4$

ii) $2x+1/1-7x < 5, x+7/x-8 > 2$

iii) $2(2x+3)-10 < 6(x-2), 2x-3/4+6 > 4+(4x/3)$

iv) $3x+1 \geq 5/2, x+2/7 > -1/3$

v) $1-7x/2 > 3, 3x+8/5 < -11$

Q14-Represent the solution set graphically:-

i) $x+y \leq 5, 4x=y \geq 4, x+5y \geq 5, x \leq 4, y \leq 3$

ii) $3y-2x < 4, x+3y > 3, x+y \leq 5$