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# Questions:

## Case Study Questions

1. Hanuman Pareek and Pawan Saini are two students of class XI th in a school. The ages of both students is represented by f and g be real functions defined by $f(x) = \sqrt{x+4}$ and $g(x) = \sqrt{16-x^2}$. Then, answer the some questions which are based on above ages.

(i) Find the domain of sum of both ages, i.e. (f+g)

| | | | |
|---|---|---|---|
| (a) [-4,4] | (b) [-2,2] | (c) [-3,3] | (d) [-5,5] |

(ii) Find the product of both ages, i.e. (f g)

| | | | |
|---|---|---|---|
| (a) $(x+2)\sqrt{4-x}$ | (b) $(x+4)\sqrt{4-x}$ | (c) $(x+4)\sqrt{x-2}$ | (d) $(x+3)\sqrt{x-2}$ |

(iii) Find the difference of both ages, i.e. (f-g)

| | | | |
|---|---|---|---|
| (a) $\sqrt{x-4}-\sqrt{4-x^2}$ | (b) $\sqrt{x+4}-\sqrt{4-x^2}$ | (c) $\sqrt{x+4}-\sqrt{16-x^2}$ | (d) $\sqrt{x+6}-\sqrt{x-6}$ |

(iv) Find the domain of $\left(\frac{f}{g}\right)$.

| | | | |
|---|---|---|---|
| (a) (-4,4) | (b) (-2,2) | (c) (-3,3) | (d) (-5,5) |

(v) Find the $\left(\frac{f}{g}\right)$

| | | | |
|---|---|---|---|
| (a) $\frac{1}{\sqrt{5+x}}$ | (b) $\frac{1}{\sqrt{4+x}}$ | (c) $\frac{1}{\sqrt{4-x}}$ | (d) $\frac{1}{\sqrt{2+x}}$ |

2. Mr. Abhishek Dubey a Mathematics class XIth teacher of write a problem on black board totest the Function". preparation about the topic 'Relation and The problem is describe as following:
"Let A be a relation be set of on first A ten natural numbers and let R defined by
$(x, y) \in R \Leftrightarrow x + 2y = 14$
i.e., $R = \{(x, y) : x \in A, y \in A$ and x+2 y=14} ".
Then, answer the following questions which are based on above problem.

(i) Find the relation (R)

| | | | |
|---|---|---|---|
| (a) {(2, 4), (4, 3), (6, 2), (8, 1)} | (b) {(2, 6), (4, 5), (6, 4), (8, 3)} | (c) {(4, 2), (3, 4), (2, 6), (1, 8)} | (d) None of the above |

(ii) Find the $R^{-1}$.

| | | | |
|---|---|---|---|
| (a) {(4, 2), (3, 4), (2, 6), (1, 8)} | (b) {(6, 2), (5, 4), (4, 6), (3, 8)} | (c) {(2, 4),(4, 3), (6, 2), (8, 1)} | (d) {(2,6), (4, 5), (6, 4), (8, 3)} |

(iii) Find Dom(R)

| | | | |
|---|---|---|---|
| (a) {2, 4, 6, 8} | (b) {3, 5, 6, 8} | (c) {4, 3, 2, 1} | (d) {4, 5, 6, 8} |

(iv) Find Range (R).

| | | | |
|---|---|---|---|
| (a) {6, 5, 4, 3) | (b) {6, 3, 8, 7} | (c) {2, 4, 8, 10} | (d) {5, 3, 1, 9} |

(v) Find Dom ($R^{-1}$)

| | | | |
|---|---|---|---|
| (a) {4, 3, 2, 1} | (b) {4, 5, 6, 8} | (c) {2, 4, 6, 8} | (d) {3, 5, 6, 8} |

## 5 Marks

3. Let f, g: R$\rightarrow$ R be defined, respectively by f(x) =x +1,g(x) =2x-3. Find f +g,f -g and $\frac{f}{g}$

4. Let A = {9, 10, 11, 12, 13} and let f : A$\rightarrow$N be defined by f(n) = the highest prime factor of n. Find the range of f.

## 3 Marks

5. The Fig shows a relationship between the sets P and Q. Write this relation (i) in set-builder form (ii) roster form. What is its domain and range?

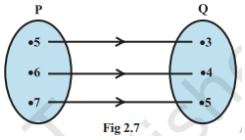


Fig 2.7

6. Which of the following relations are functions? Give reasons. If it is a function determine its domain and range.
(i) {(2,1), (5,1), (8,1), (11,1), (14,1), (17,1)}
(ii) {(2,1), (4,2), (6,3), (8,4), (10,5), (12,6), (14,7)}
(iii) {(1,3), (1,5), (2,5)}.

7. Draw the graph of the function f :R $\Rightarrow$ R defined by f (x) = $x^3$, x$\in$ R

8. Find the domain and the range of the real function f defined by f (x) = $\sqrt{(x-1)}$

## 2 Marks

9. If $(\frac{x}{3}+1, y-\frac{2}{3}) = (\frac{5}{3}, \frac{1}{3})$ , then find the values of x and y.

10. If the set A has 3 elements and the set B ={3, 4, 5}, then find the number of elements in (A x B).

11. Write the relation R = {(x, $x^3$): x is a prime number less than 10} in roster form.

12. Let N be the set of natural numbers and the relation R be defined on N such that R = {(x, y) : y = 2x, x, y $\in$ N}.
What is the domain, codomain and range of R? Is this relation a function?

13. Find the domain of the function $f(x) = \frac{x^2+3x+5}{x^2-5x+4}$