



1	The range of the relation $R = \{(x, x^2) : x \text{ is a prime number less than } 15\}$ is (a) $\{2, 3, 5, 7\}$ (b) $\{2, 3, 5, 11\}$ (c) $\{2, 3, 5, 7, 11, 13\}$ (d) $\{4, 9, 25, 49, 121, 169\}$
2	If the ordered pairs $(a + 2, 4) = (5, 2a + b)$ are equal, then the value of a and b are (a) $(2, -2)$ (b) $\{3, -2\}$ (c) ϕ (d) $\{2, 3\}$
3	If there are 1024 relations from a set $A = \{1, 2, 3, 4\}$ to a set B , then the number of elements of B is: (a) 3 (b) 2 (c) 4 (d) 8
4	For two sets A and B , given $n(A \times B) = 6$ and three of the elements of $A \times B$ are $(2, 5)$, $(4, 6)$, $(8, 6)$. Then the remaining elements are (a) $(2, 6), (4, 5), (8, 5)$ (b) $(2, 4), (4, 8), (5, 6)$ (c) $(2, 6), (4, 5), (4, 8)$ (d) $(2, 4), (4, 5), (6, 8)$
5	If A and B are two sets having m and n elements, respectively and having p elements common. The number of possible relations which can be defined from A to B is (a) 2^{m+n} (b) 2^{m+n-p} (c) 2^{mn} (d) 2^{mn-p}
6	The domain of $f(x) = \sqrt{25 - x^2}$ is (a) $\mathbb{R}$ (b) $(-5, 5)$ (c) $[-5, 5]$ (d) $(-\infty, 5)$
7	Find the domain and range of the relation R , where $R = \{(x + 1, x + 5)\}$, $x \in \{0, 1, 2, 3, 4, 5\}$ is (a) $D = \{0, 1, 2, 3, 4, 5\}$, $R = \{0, 1, 2, 3, 4, 5\}$ (b) $D = \{0, 1, 2, 3, 4, 5\}$, $R = \{5, 6, 7, 8, 9, 10\}$ (c) $D = \{1, 2, 3, 4, 5, 6\}$, $R = \{0, 1, 2, 3, 4, 5\}$ (d) $D = \{1, 2, 3, 4, 5, 6\}$, $R = \{5, 6, 7, 8, 9, 10\}$
8	The set B is the range of a constant function. Then, $n(B)$ equals (a) 0 (b) 1 (c) 2 (d) 3
9	If $n(A \cap B) = 5$, then $n((A \times B) \cap (B \times A))$ is equal to. (a) 5 (b) 20 (c) 25 (d) 16

10	$A = \{a, b, c\}$, $B = \{2, 3\}$, $C = \{a, b, c, d\}$, then number of elements in $(A \cup C) \times B$ is (a) 24 (b) 8 (c) 12 (d) 16
11	The range of the function $f(x) = \frac{x}{1+x^2}$ is (a) $\left[-\frac{1}{2}, \frac{1}{2}\right]$ (b) $\left[\frac{1}{2}, \frac{1}{4}\right]$ (c) $\left(-\frac{1}{2}, \frac{1}{4}\right)$ (d) $\left(0, \frac{1}{2}\right)$
12	If $f\left(x - \frac{1}{x}\right) = x^2 + \frac{1}{x^2}$, then $f(x) =$ (a) $x^2 + 2$ (b) $x^2 - 2$ (c) $x^2 + \frac{1}{x^2}$ (d) $x^2 - \frac{1}{x^2}$
13	The domain of the real function $f(x) = \frac{1}{\sqrt{x^2 - 64}}$ is: (a) $(8, \infty)$ (b) $(-\infty, 8)$ (c) $(-\infty, -8)$ (d) $(-\infty, -8) \cup (8, \infty)$
14	There are 4096 relations from a set A to a set B. If the set A has 6 elements, then the number of elements in the set B is: (a) 32 (b) 2 (c) 128 (d) 1024
15	The domain of the function $f(x) = \sqrt{x-1} + \frac{1}{x-5}$ is: (a) $x > 1$ (b) $x < 1$ (c) $x \geq 1, x \neq 5$ (d) $x = 1$
16	The domain of the function $f(x) = \frac{1}{\sqrt{(x-10)(12-x)}}$ is. (a) $[10, 12]$ (b) $(12, \infty)$ (c) $(10, 12)$ (d) $[12, \infty)$
17	The range of the function $f(x) = \frac{3x+5}{4x-7}$ is: (a) $\mathbb{R}$ (b) $\mathbb{R} - \{7\}$ (c) $\mathbb{R} - \left\{\frac{1}{4}\right\}$ (d) $\mathbb{R} - \left\{\frac{3}{4}\right\}$
18	The range of the function $f(x) = x + x+4 $ is: (a) $[4, \infty)$ (b) $[4, 5]$ (c) $[0, 4]$ (d) $[5, \infty)$
19	The range of the function $\frac{1}{2 - \cos 3x}$ is: (a) $\left[\frac{1}{3}, 1\right)$ (b) $\left[\frac{1}{3}, 1\right]$ (c) $\left(\frac{1}{3}, 1\right]$ (d) $\left(\frac{1}{3}, 1\right)$

20	If $\left(\frac{x}{2}+1, y-\frac{2}{3}\right)=\left(\frac{3}{2}, \frac{1}{3}\right)$, find the values of x and y .
21	If $f(x)=x^2$ and $g(x)=2x+1$ are two real functions, find $(f+g)(x)$.
22	What is the domain of the real valued function $f(x)=\frac{1}{3x-2}$?
23	If $A \times B=\{(a, x),(a, y),(b, x),(b, y)\}$, find A and B .
24	$A=\{1, 2, 3, 4\}$ and $B=\{4, 6, 9\}$. Define a relation R from A to B by $R=\{(x, y): \text{the difference between } x \text{ and } y \text{ is odd, } x \in A \text{ and } y \in B\}$. Write R in roster form.
25	Find the domain and range of the function $f(x)=\frac{1}{1-x^2}$
26	If $f(x)=\frac{x-1}{x+1}$, where is a real function, then prove that $f(2x)=\frac{3f(x)+1}{f(x)+3}$
27	Let $A=\{1, 2, 3, \dots, 14\}$. Define a relation R from A to A by $R=\{(x, y): 3x-y=0, \text{ where } x, y \in A\}$. Write domain, co-domain and range.
28	Find the domain and range of the real function $f(x)=\sqrt{9-x^2}$
29	Find the domain and range of the function f defined by $f(x)=\frac{1}{\sqrt{9-x^2}}$.
30	Find the domain and range of the real function f defined by $f(x)=\sqrt{x-1}$.
31	Define a relation R on the set N of natural numbers by $R=\{(x, y): y=x+5, x \text{ is a natural number less than } 4; x, y \in N\}$.
32	Let $f(x)=x^2$ and $g(x)=2x+1$ be two real functions. Find $(f+g)(x)$, $(f-g)(x)$, $(fg)(x)$ and $\left(\frac{f}{g}\right)(x)$.
33	The relation R is defined as $R=\{(x, x+5)\}: x \in \{0, 1, 2, 3, 4, 5\}$. Write R in roster form. Write down the domain and range.
34	If $A \times B=\{(a, 1),(b, 3),(a, 3),(b, 1),(a, 2),(b, 2)\}$, find A and B .

35	If $A \times B = \{(a, 1), (a, 2), (a, 5), (b, 1), (b, 2), (b, 5)\}$, find $B \times A$.
36	Let A and B be two sets such that $A \times B$ consist of 6 elements. If three elements of $A \times B$ are (1, 4), (2, 6), (3, 6), find $A \times B$.
37	Let $R = \{(x, y) : x, y \in \mathbb{N} \text{ and } 2x + y = 9\}$, $\mathbb{N}$ being the set of natural numbers. Write R as the set of ordered pairs.
38	Write the domain of the function $f(x) = \frac{x^2 + 2x + 3}{x^2 - 5x + 6}$
39	Find the range of the relation defined by $R = \{(x, x + 3) : x \in \{0, 1, 2, 3, 4, 5\}\}$.
40	Let $A = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$. Define a relation R from A to A defined by $R = \{(x, y) : 2x - y = 0 \text{ where } x, y \in A\}$. Write in roster form.
41	Examine whether the relation $R = \{(2, 2), (2, 4), (3, 3), (4, 4)\}$ is a function. Justify your answer.
42	Let $A = \{1, 2\}$ and $B = \{a, b\}$. Write $A \times B$. How many subsets $A \times B$ will have?
43	Let $A = \{-1, 0, 2, 3\}$, $B = \{1, 2, 5, 8, 9, 10\}$ and $f = \{x, y\} : y = x^2 + 1, x \in A \text{ and } y \in B\}$. List the element of f.
44	Let $A = \{1, 2, 3, 4\}$ and $S = \{(a, b) : a \in A, b \in A, a \text{ divides } b\}$. Write the elements of S.
45	Let $A = \{x, y, z\}$ and $B = \{1, 2\}$. Find the number of relations from A to B.
46	If $\left(\frac{x}{3} + 1, y - \frac{2}{3}\right) = \left(\frac{5}{3}, \frac{1}{3}\right)$, find the values of x and y.
47	If f and g are two functions defined on real numbers such that $f(x) = 3x + 1$ and $g(x) = x^2 + 2$, then find (i) $f + g$ (ii) $f - g$ (iii) fg (iv) $\frac{f}{g}$
48	Find the domain and range of the function $f(x) = \sqrt{1 - x^2}$

Answers

1	D	2	B	3	B	4	A
5	C	6	C	7	D	8	B
9	C	10	B	11	A	12	A
13	D	14	B	15	C	16	C
17	D	18	A	19	B	20	$x = 1, y = 1$

21	$x^2 + 2x + 1$	22	Domain $(f) = \mathbb{R} - \left\{\frac{2}{3}\right\}$
23	$A = \{a, b\}$ and $B = \{x, y\}$.	24	R in roster form is $\{(1, 4), (1, 6), (2, 9), (3, 4), (3, 6), (4, 9)\}$.
25	Domain of $f = \mathbb{R} - \{-1, 1\}$. $f = (-\infty, 0) \cup [1, \infty)$.		
27	Domain = $\{1, 2, 3, 4\}$, co-domain = A and range = $\{3, 6, 9, 12\}$.		
28	Domain of $f(x) = [-3, 3]$. The range of $f(x)$ is $[0, 3]$.		
29	Domain $(f) = (-3, 3)$. Range of $f = \left[\frac{1}{3}, \infty\right)$.		
30	Domain $(f) = [1, \infty)$ Range $(f) = [0, \infty)$.		
31	Domain = $\{1, 2, 3\}$ Range = $\{6, 7, 8\}$	32	$(f + g)(x) = f(x) + g(x) = x^2 + 2x + 1$ $(f - g)(x) = f(x) - g(x) = x^2 - (2x + 1) = x^2 - 2x - 1$ $(fg)(x) = f(x)g(x) = x^2(2x + 1) = 2x^3 + x^2$ $\frac{f(x)}{g(x)} = \frac{x^2}{2x + 1}, x \neq -\frac{1}{2}$
33	Domain = $\{0, 1, 2, 3, 4, 5\}$ Range = $\{5, 6, 7, 8, 9, 10\}$	34	$A = \{a, b\}$, $B = \{1, 2, 3\}$
35	$B \times A = \{(1, a), (2, a), (5, a), (1, b), (2, b), (5, b)\}$.		
36	$A \times B = \{(1, 4), (1, 6), (2, 4), (2, 6), (3, 4), (3, 6)\}$.		
37	$R = \{(1, 7), (2, 5), (3, 3), (4, 1)\}$	38	$x = 2, 3$
39	$R = \{3, 4, 5, 6, 7, 8\}$	40	$R = \{(1, 2), (2, 4), (3, 6), (4, 8), (5, 10)\}$.
41	R is not a function because 2 have two images.		
42	$A \times B = \{(1, a), (1, b), (2, a), (2, b)\}$. No. of subsets = $2^4 = 16$.		
43	$f = \{(-1, 2), (0, 1), (2, 5), (3, 10)\}$		
44	$S = \{(1, 1), (1, 2), (1, 3), (1, 4), (2, 2), (2, 4), (3, 3), (4, 4)\}$		
45	No. of relations = No. subsets of $A \times B = 2^6 = 64$.		
46	$x = 2, y = 1$.		

47	$(i) (f + g)(x) = f(x) + g(x) = x^2 + 3x + 3$ $(ii) (f - g)(x) = f(x) - g(x) = 3x - x^2 - 1$ $(iii) (fg)(x) = f(x)g(x)$ $= 3x^3 + x^2 + 6x + 2$ $(iv) \left(\frac{f}{g}\right)(x) = \frac{f(x)}{g(x)} = \frac{3x + 1}{x^2 + 1}.$
48	Domain of $f = \{x \in \mathbb{R} : -1 \leq x \leq 1\} = [-1, 1].$ Range = $\{y \in \mathbb{R} : 0 \leq y \leq 1\} = [0, 1].$