MATHS

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RELATIONS AND FUNCTION

Exercise 1 1

1. Find $A \times B, A \times A$ and $B \times A$

$A = \{2, -2, 3\}, B = \{1, -4\}$

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2. Find $A \times B, A \times A$ and $B \times A$

$A = B = \{p, q\}$

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3. Let $A = \{1, 2, 3)$ and $B = \{x \mid x$ is the prime number less than 10}. Find $A \times B$ and $B \times A$.

4. If $B \times A = \{(-2, 3), (-2, 4), (0, 3), (0, 4), (3, 3), (3, 4)$ find A and B

5. If $A = \{5, 6\}, B = \{4, 5, 6\}, C = \{5, 6, 7\}$. Show that $A \times A = (B \times B) \cap (C \times C)$.

6. Given $A = \{1, 2, 3\}$, $B = \{2, 3, 5\}$, $C = \{3, 4\}$ and $D = \{1, 3, 5\}$,

check $(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$ is true?

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7.   Let

$A = \{X \in W \mid x < 2\}$, $B = \{x \in N \mid 1 < x \leq 4\}m$ and $C = \{3, 5\}$.

verify that

$A \times (B \cup C) = (A \times B) \cup (A \times C)$

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8.   Let

$A = \{X \in W \mid x < 2\}$, $B = \{x \in N \mid 1 < x \leq 4\}m$ and $C = \{3, 5\}$.

verify that

$A \times (B \cap C) = (A \times B) \cap (A \times C)$

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9. Let

$A = \{X \in W \mid x < 2\}, B = \{x \in N \mid 1 < x \le 4\}m$ and $C = \{3, 5\}$.

verify that

$(A \cup B) \times C = (A \times C) \cup (B \times C)$

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10. Let A= The set of all natural numbers less than 8, B=The set of all prime numbers less than 8, C= The set of even prime number. Verify that

$(A \cap B) \times C = (A \times C) \cap (B \times C)$

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11. Let A= The set of all natural numbers less than 8, B=The set of all prime numbers less than 8, C= The set of even prime number. Verify that

$$A \times (B - C) = (A \times B) - (A time C)$$

Exercise 1 2

1. Let $A = \{1, 2, 3, 7\}$ and $B = \{3, 0, -1, 7\}$, which of the following are relation from A to B?

$$R_1 = \{(2, 1), (7, 1)\}$$

2. Let $A = \{1, 2, 3, 7\}$ and $B = \{3, 0, -1, 7\}$, which of the following are relation from A to B?

$$R_2 = \{(-1, 1)\}$$

3. Let $A = \{1, 2, 3, 7\}$ and $B = \{3, 0, -1, 7\}$, which of the following are relation from A to B?

$$R_3 = \{(2, -1), (7, 7), (1, 3)\}$$

4. Let $A = \{1, 2, 3, 7\}$ and $B = \{3, 0, -1, 7\}$, which of the following are relation from A to B?

$$R_4 = \{(7, -1), (0, 3), (3, 3), (0, 7)\}$$

5. Let $A = \{1, 2, 3, 4..., 45\}$ and R be the relation defined as "is square of" on A. Write R as a subset of $A \times A$. Also, find the domain and range of R.

6. A Relation R is given by the set $\{(x, y) \mid y = x + 3, x \in \{0, 1, 2, 3, 4, 5\}\}$. Determine its domain and range .

7. Represent each of the given relation by (a) an arrow diagram, (b) a graph and (C) a set in roster form, wherever possible.

$\{(x, y) \mid x = 2y, \xi n\{2, 3, 4, 5\}, y \in \{1, 2, 3, 4\}$.

8. Represent each of the given relation by (a) an arrow diagram, (b) a graph and (C) a set in roster form, wherever possible.

$\{(x, y) \mid y = x + 3, x, y$ are natural number $< 10\}$

9. A company has four categories of employees given by Assistants (A), Clerks(C), Mangagers (M) and an Excutive Officer(E). The company provide ₹10,000, ₹25,000, ₹50,000 and ₹1,00,000 as salaries to the people who work in the categories A, C, M and E respectively. If A_1, A_2, A_3, A_4 and A_5 were Assistants, C_1, C_2, C_3, C_4 were Clerks, M_1, M_2 and M_3 were managers and E_1, E_2 were Executive officers and if the relation R is defined by xRy, where x is the salary given to person y, express the relation R through an ordered pair and an arrow diagram/

1. Let $f = \{(x, y) \mid x, y \in N \text{ and } y = 2x\}$ be a relation on N. Find the domain, co-domain and range. Is this relation a function?

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2. Let $x = \{3, 4, 6, 8\}$. Determine whether the relation $R = \{(x, f(x)) \mid x \in X, f(x) = x^3 + 1\}$ is a function from X to N ?

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3. Given the function $f: x \to x^2 - 5x + 6$, evaluate

f(-1)

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4. Given the function $f: x \to x^2 - 5x + 6$, evaluate

f(2a)

5. Given the function $f: x \to x^2 - 5x + 6$, evaluate

f(2)

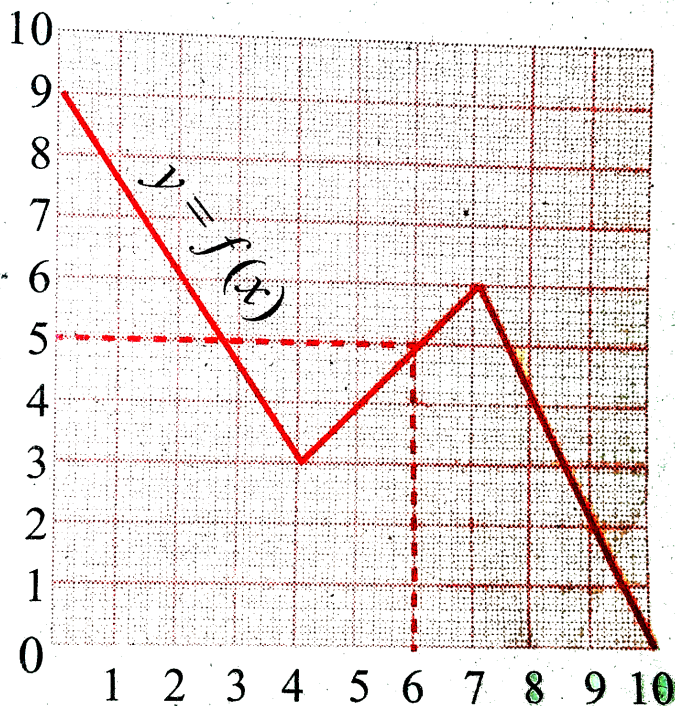**6.** Given the function $f: x \to x^2 - 5x + 6$, evaluate

f(x-1)

7. A graph representing the function f(x) is given in figure it is clear that $f(9) = 2$.

Find the following values of the function (a)f(0) (b)f(7) (c)f(2) (d)f(10)

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8. Let $f(x) = 2x + 5$. If $x \neq 0$ then find $\dfrac{f(x + 2) - f(2)}{x}$

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9. A function is defined by $f(x) = 2x - 3$

Find $\dfrac{f(0) + f(1)}{2}$.

10. A function is defined by $f(x) = 2x - 3$

Find x such that $f(x) = 0$.

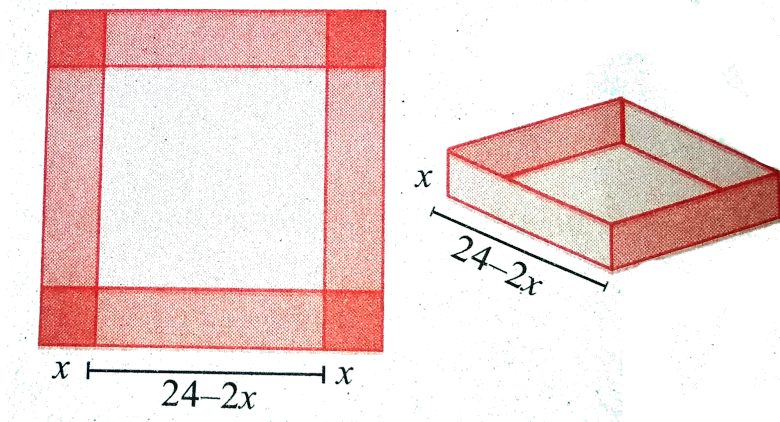**11.** A function is defined by $f(x) = 2x - 3$

Find x such that $f(x) = x$.

12. A function is defined by $f(x) = 2x - 3$

Find x such that $f(x) = f(1 - x)$.

13. An open box is to be made from a square piece of material, 24 cm on a side, by cutting equal squares from the corners and turning up the sides as shown in figure. Express volume V of the box as a function of x.

14. A function f is defined by $f(x) = 3 - 2x$. Find x such that $f(x^2) = (f(x))^2$.

15. a plane is flying at a speed of 500 km per hour. Express the distance d travelled by the plane as function of time t in hours.

16. The data in the adjcent table depicts the length of a woman's foreheads and her corresponding height. Based on this data, a student finds a relationship between the height (y) and the forehead length (x) as $y = ax + b$, where a, b are constants.

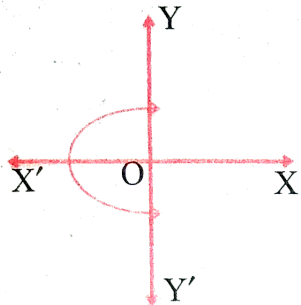| Length 'x' of forehand (in cm)	Height 'y' (in inches)
35	56
45	65
50	69.5
55	74

Check if this relation is a functions.
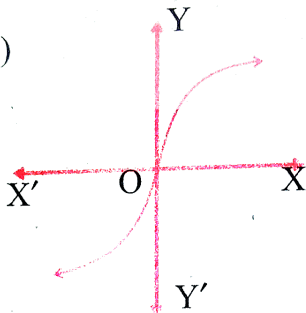
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Exercise 1 4

1. Determine whether the graph given below represents functions.

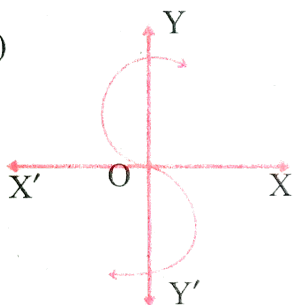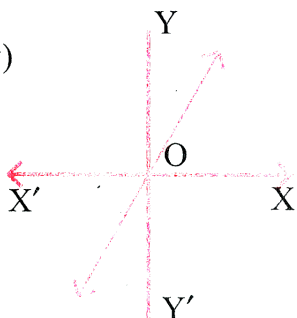Give reason for your answers concering each graph
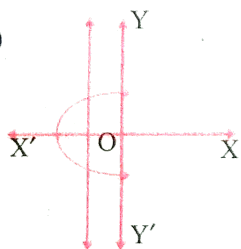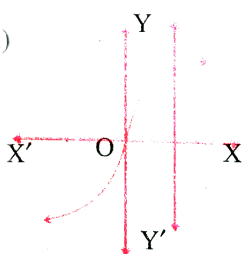
(i)

(ii)

(iii)

(iv)

(i)

(ii)

(iii)

(iv)

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2. Let: $f: A \rightarrow B$ be a function defined by $f(x) = \dfrac{x}{2} - 1$. Where `A=

{2, 4, 6, 10, 12}, B={0, 1, 2, 4, 5, 9}. Represents f by

set of ordered pairs,

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3. Let: $f: A \rightarrow B$ be a function defined by $f(x) = \dfrac{x}{2} - 1$. Where `A=

{2, 4, 6, 10, 12}, B={0, 1, 2, 4, 5, 9}. Represents f by

a table,

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4. Let: $f: A \rightarrow B$ be a function defined by $f(x) = \dfrac{x}{2} - 1$. Where `A=

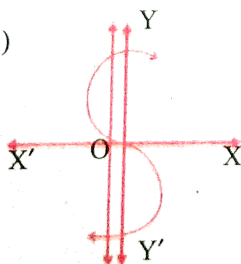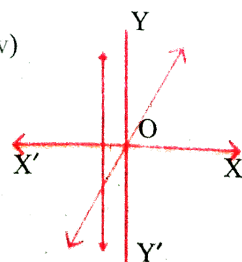{2, 4, 6, 10, 12}, B={0, 1, 2, 4, 5, 9}. Represents f by

an arrow diagram diagram,

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5. Let: $f: A \to B$ be a function defined by $f(x) = \dfrac{x}{2} - 1$. Where `A=

{2, 4, 6, 10, 12}, B={0, 1, 2, 4, 5, 9}. Represents f by

a graph,

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6. Represent the function $f = \{(1, 2), (2, 2), (3, 2), (4, 3), (5, 4)\}$

through

an arrow diagram

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7. Represent the function $f = \{(1, 2), (2, 2), (3, 2), (4, 3), (5, 4)\}$

through

a table form

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8. Show that the function $f: N \to N$ defined by $f(x) = 2x - 1$ is one-one but not onto.

9. Show that the function $f: N \to N$ defined by $f(m) = m^2 + m + 3$ is one-one function.

10. Let $A = \{1, 2, 3, 4, \}$ and $B = N.$ Let $f: A \to B$ be defined by f(x) $= x^2$ then.

find the range of f

11. Let $A = \{1, 2, 3, 4, 5\}, B = N$ and $f : A \to B$ be defined by $f(x) = x^2$. Find the range of f. Identify the type of function.

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12. In each of the following cases state whether the functions is bijective or not. Justify your answer:

$f : R \to R$ $def \in edby$f(x)=2x+1`

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13. In each of the following cases state whether the functions is bijective or not. Justify your answer:

$f : R \to R$ defined by $f(x) = 3 - 4x^2$

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14. Let $A = \{-1, 1\}$ and $B = \{0, 2\}$. If the functions $f: A \to B$ defined by $f(x) = ax + b$ is an onto function? Find a and b.

15. If the function f is defined by $f(x) = \begin{cases} x + 2, & x > 1 \\ 2, & -1 \le x \le 1 \\ x - 1, & -3 < x < -1 \end{cases}$

then find the values of (i) $f(3)$

16. If the function f is defined by $f(x) = \begin{cases} x + 2, & x > 1 \\ 2, & -1 \le x \le 1 \\ x - 1, & -3 < x < -1 \end{cases}$

then find the values of (ii) $f(0)$

17. If the function f is defined by

$$f(x) = \{(x + 2, \quad \text{if} x > 1), (2 \quad \text{if-1lexle1}$$

$$), (x - 1 \quad \text{if} - 3 < x < -1) :\} \quad \text{find the values of}$$

f(-1.5)

18. If the function f is defined by $f(x) = \begin{cases} x + 2, & x > 1 \\ 2, & -1 \le x \le 1 \\ x - 1, & -3 < x < -1 \end{cases}$

then find the values of (iv) $f(2) + f(-2)$

19. A function $f : [-5, 9] \to R$ is defined as follows:

$$f(x) = \{(6x + 1 \quad \text{if} - 5 \le x < 2), (5x\text{\textasciicircum}(2)\text{-}1" \quad \text{if} \quad "2\text{lexlt}6), (3x\text{-}4" \quad \text{if} \quad "$$

6lexle9):$\}F \in d$f(-3)+f(2)`

20. A function $f : [-5, 9] \to R$ is defined as follows:

$f(x) = \{(6x + 1 \ \text{if} -5 \leq x < 2), (5x^2-1 \ \text{if} \ 2 \leq x < 6), (3x-4 \ \text{if} \ 6 \leq x \leq 9):\} F \in df(7)\text{-}f(1)$

21. A function $f : [-5, 9] \to R$ is defined as follows:

$f(x) = \{(6x + 1 \ \text{if} -5 \leq x < 2), (5x^2-1 \ \text{if} \ 2 \leq x < 6), (3x-4 \ \text{if} \ 6 \leq x \leq 9):\} F \in d2f(4)\text{+}f(8)$

22. A function $f : [-5, 9] \to R$ is defined as follows:

$f(x) = \{(6x + 1 \ \text{if-}5 \leq x < 2$

$), (5x^2 - 1 \ \text{if} \ 2 \leq x < 6), (3x - 4 \ \text{if} \ 6 \leq x \leq 9):\}$

Find $\dfrac{2f(-2) - f(6)}{f(4) + f(-2)}$

23. The distance S an object travles under the influence of gravity in time t seconds is given by $S(t) = \frac{1}{2}\mathrm{gt}^2 + at + b$ where, (g is the acceleration due to gravity), a, b, are constants. Check if the function S(t) is one-one.

24. The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by t(C)=F where $F = \frac{9}{5}C + 32.$

Find t(0)

25. The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by t(C)=F where $F = \dfrac{9}{5}C + 32.$

Find t(28)

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26. The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by t(C)=F where $F = \dfrac{9}{5}C + 32.$

Find t(-10)

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27. The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by t(C)=F where

$$F = \frac{9}{5}C + 32.$$

Find the value of C where t(C)=212

28. The function 't' which maps temperature in Celsius (C) into temperature in Fahrenheit (F) is defined by t(C)=F where

$$F = \frac{9}{5}C + 32.$$

Find the temperature when the Celsius value is equal to the Fahrenheit value.

Exercise 1 5

1. Using the functions f and given below ,find $f \circ g$ and $g \circ f$, Check whether $f \circ g = g \circ f$,

$f(x) = x-6, g(x) = x^2$

2. Using the function f and g given below, find the fog and gof. Check whether fog-gof.

$$f(x) = \frac{2}{x}, g(x) = 2x^2 - 1$$

3. Using the function f and g given below, find the fog and gof. Check whether fog=gof.

$$f(x) = \frac{x+6}{3}, g(x) = 3 - x$$

4. If $f(x) = 3 + x, g(x) = x - 4$, then check whether fog=gof.

5. Using the function f and g given below, find the fog and gof. Check whether fog=gof.

`f(x)=4x^(2)-1, g(x)=1+x

6. Find the value of k, such that fog=gof

$$f(x) = 3x + 2, g(x) = 6x - k$$

7. Find the value of k, such that fog=gof

$$f(x) = 2x - k, g(x) = 4x + 5$$

8. If $f(x) = 2x - 1$, $g(x) = \dfrac{x+1}{2}$, show that $fog = gof = x$.

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9. If $f(x) = x^2 - 1$, $g(x) = x - 2$ find a, if gof(a)=1.

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10. Find k, if $f(k) = 2k - 1$ and $fof(k) = 5$.

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11. Let $A, B, C \in N$ and a function $f: A \to B$ be defined by $f(x) = 2x + 1$ and $g: B \to C$ be defined by $g(x) = x^2$. Find the range of fog and gof.

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12. Let $f(x) = x^2 - 1$ Find

$f \circ f$

(ii) $f \circ f \circ f$

13. If $f: R \to R$ and $g: R \to R$ are defined by $f(x) = x^5$ and $g(x) = x^4$ then check if f, g are one-one and fog is one-one?

14. Consider the function $f(x), g(x), h(x)$ as given below , Show that $(f \circ g) \circ h = f \circ (g \circ h)$ in each case.

$f(x) = -x - 1, g(x) = 3x + 1$ and $h(x) = x + 4$

15. Consider the function $f(x), g(x), h(x)$ as given below. Show that $(fog)oh = fo(goh)$ in each case.

$f(x) = x^2, g(x) = 2x$ and $h(x) = x + 4$

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16. Consider the function $f(x), g(x), h(x)$ as given below. Show that $(fog)oh = fo(goh)$ in each case.

$f(x) = x - 4, g(x) = x^2$ and $h(x) = 3x - 5$

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17. Let $f = \{(-1, 3), (0, -1), (2, -9)\}$ be linear function from Z into Z. Find f(x).

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18. In electrical circuit theory, a circuit C(t) called a linear circuit if it satisfies the superposition principle given by $C(at_1 + bt_2) = aC(t_1) + bC(t_2)$, where a, b are constants. Show that the circuits $C(t) = 3t$ is linear.

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Exercise 1 6

1. If $n(A \times B) = 6$ and $A = \{1, 3\}$, then $n(B)$ is

A. 1

B. 2

C. 3

D. 6

Answer: c

2. $A = \{a, b, p\}, B = \{2, 3\}, C = \{p, q, r, s\}$ then $n[(A \cup C) \times B]$ is

A. 8

B. 20

C. 12

D. 16

Answer: c

3. If $A - \{1, 2\}, B = \{1, 2, 3, 4\}, C = \{5, 6\}$ and D={5, 6, 7, 8}` then state which of the following statement is true.

A. $(A \times C) \subset (B \times D)$

B. $(B \times D) \subset (A \times C)$

C. $(A \times B) \subset (A \times D)$

D. $(D \times A) \subset (B \times A)$

Answer: a

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4. If there are 1024 relations from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the number of elements in B is

A. 3

B. 2

C. 4

D. 8

Answer: b

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5. The range of the relation $r = \{(x, x^2) \mid x$ is a prime number less than 13$\}$ is

A. $\{2, 3, 5, 7\}$

B. $\{2, 3, 5, 7, 11\}$

C. $\{4, 9, 25, 49, 121\}$

D. $\{1, 4, 9, 25, 49, 121\}$

Answer: c

6. If the ordered pairs $(a + 2, 4)$ and $(5, 2a + b)$ are equal to then (a, b) is

A. $(2, -2)$

B. $(5, 1)$

C. $(2, 3)$

D. $(3, -2)$

Answer: d

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7. Let $n(A) = m$ and $n(B) = n$ that the total number of non-empty relations that can be defined from A to B is

A. m^n

B. n^m

C. $2^{nm} - 1$

D. 2^{mn}

Answer: d

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8. If $\{(a, 8), (6, b)\}$ represents an identity functions then the values of a and b are respectively

A. $(8, 6)$

B. $(8, 8)$

C. $(6, 8)$

D. $(6, 6)$

Answer: a

9. Let $A = \{1, 2, 3, 4\}$ and $B = \{4, 8, 9, 10\}$. A function $f: A \to B$ given by $f = \{(1, 4), (2, 8), (3, 9), (4, 10)\}$ is a

A. Many -one function

B. Identify funciton

C. One-to-one funciton

D. Into function

Answer: c

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10. If $f(x) = 2x^2$ and $g(x) = \dfrac{1}{3x}$. Then fog is

A. $\dfrac{3}{2x^2}$

B. $\dfrac{2}{3x^2}$

C. $\dfrac{2}{9x^2}$

D. $\dfrac{1}{6x^2}$

Answer: c

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11. If $f: A \to B$ is a bijective function and if $n(B) = 7$, then n(A) is equal to

A. 7

B. 49

C. 1

D. 14

Answer: a

12. Let f and g be two functions given by

$f = \{(0, 1), (2, 0), (3, -4), (4, 2), (5, 7)\}$

$g(x) = \{(0, 2), (1, 0), (2, 4), (-4, 2), (7, 0)\}$ then the range of fog is

___.

A. $(0, 2, 3, 4, 5\}$

B. $\{-4, 1, 0, 2, 7\}$

C. $\{1, 2, 3, 4, 5\}$

D. $\{0, 1, 2\}$

Answer: d

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13. Let $f(x) = \sqrt{1 + x^2}$ then

A. $f(xy) = f(x)f(y)$

B. $f(xy) \geq f(x)f(y)$

C. $f(xy) \leq f(x)f(y)$

D. None of these

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14. If $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are

A. $(-1, 2)$

B. $(2, -1)$

C. $(-1, -2)$

D. $(1, 2)$

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15. $f(x) = (x + 1)^3 - (x - 1)^3$ represents a functions which is

A. linear

B. cubic

C. reciprocal

D. quadratic

Answer: d

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Solution To Unit Exercise

1. If the ordered pairs $(x^2 - 3x, y^2 + 4y)$ and $(-2, 5)$ are equal to then find x and y.

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2. The Cartesian product $A \times A$ has 9 elements among which $(-1, 0)$ and $(0, 1)$ are found. Find the set A and the remaining elements of $A \times A$.

3. Given that $f(x) = \{(\sqrt{x-1}, x \geq 1), (4, x < 1)\}$

find f(0)

4. Let $A = \{9, 10, 11, 12, 13, 14, 15, 16, 17\}$ and let $f: A \to N$ be defined by f(n)= the highest prime factor of $n \in A$. Write f as a set of ordered pairs and find the range of f.

5. Find the domain of the function $f(x) = \sqrt{1 + \sqrt{1 - \sqrt{1 - x^3}}}$

6. If $f(x) = x^2$, $g(x) = 3x$ and $h(x) = x - 2$. Prove that $(fog)oh = fo(goh)$.

7.

$A = \{1, 2\}$ and $B = \{1, 2, 3, 4\}$, $C = \{5, 6\}$ and $D = \{5, 6, 7, 8\}$.

Verify whether $A \times C$ is a subset of $B \times D$?

8. If f (x) $= \dfrac{x - 1}{x + 1}$, $x \neq 1$ Show that f(f(x)) = $\dfrac{1}{x}$ provided $x \neq 0$

9. The function f and g are defined by $f(x) = 6x + 8$, $g(x) = \dfrac{x - 2}{3}$.

Calculate the value of $g\dfrac{g(1)}{2}$

10. The function f and g are defined by $f(x) = 6x + 8$, $g(x) = \dfrac{x - 2}{3}$.

Write an expression for gf(x) in its simplest form.

11. Write the domain of the following real functions

$$f(x) = \dfrac{2x + 1}{x - 9}$$

12. Write the domain of the following real functions

$$p(x) = \frac{-5}{4x^2 + 1}$$

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13. Write the domain of the following real functions

$$g(x) = \sqrt{x - 2}$$

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14. Write the domain of the following real functions

$$h(x) = x + 6$$

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Solution To Thinking Corner

1. When Will $A \times B$ be equal to $B \times A$

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2. Is the relation representing the association between planets and their respective moons a function ?

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3. Can there be a one to many functions ?

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4. Is an identify function one-one function ?

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5. If f (x) $= x^m$ and $g(x) = x^n$ does $f \circ g = g \circ f$?

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Solution To Progress Check

1. For any two non-empty sets A and B, $A \times B$ is called as ....

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2. If $n(A \times B) = 20$ and $n(A) = 5$ then $n(B) =$

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3. If $A = \{-1, 1, \}$ and $B = (-1, 1)$ then geometrically describe the set of points of $A \times B$

4. Let A =$\{1, 2, 3, 4\}$ and $B = \{a, b, c\}$

Which of the following are relations from A to B ?

A. $\{(1, b), (1, c), (3, a), (4, b)\}$

B. $\{(1, a), (b, 4), (c, 3)\}$

C. $\{(1, a), (a, 1), (2, b), (b, 2)\}$

D.

Answer: (I)

5. Let A =$\{1, 2, 3, 4\}$ and $B = \{a, b, c\}$

Which of the following are relations from A to B ?

A. $\{(c, a), (c, b), (c, 1)\}$

B. $\{(c, 1), (c, 2), (c, 3), (c, 4)\}$

C. $\{(a, 4), (b, 3), (c, 2)\}$

D.

Answer: (iii)

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6. Relation are subsets of............... Funcitons are subsets of ....

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7. True or False : All the elements of a relation should have images.

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8. True of False : All the elements of a function should have images

9. True or False : If R: $A \to B$ is a relation then the domain of $R = A$

10. If f : $N \to N$ is defined as f (x) $= x^2$ the pre-image of 1 and 2 are

....

11. The difference between relation and function is ....

12. Let A and B be two non-empty finite sets, The which one among the following two collection is large?

(i) The number of relations between A and B

(ii) the number of function between A and B

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Solution To Progress Check True Or False

1. All one-one function are onto functions

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2. There will be no one-one function from A to B when $n(A) = 4, n(B) = 3$

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3. All onto functions are one-one functions

4. There will be no onto function from A to B when n(A) =4, n(B) =5

5. If f is a bijection from A to B , then n(A) =n(B)

6. If f is a bijection from A to B , then n(A) =n(B)

7. All constant functions are bijections.

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Solution To Progress Check Choose Correct Option

1. Composition of functions is commutative :

    A. Always true

    B. Never true

    C. Sometimes true

    D.

Answer: b

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2. Composition of functions is associative :

A. Always true

B. Never true

C. Sometimes true

D.

Answer: a

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Solution To Progress Check Yes Or No

1. Is a constant function a linear function ?

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2. Is quadratic function a one-one function ?

3. Is cubic function a one-one function ?

4. Is the reciprocal function a bijection ?

5. If $f : A \rightarrow B$ is a constant function , then the range of f will have

...................element

1. Let A = $\{x \mid x \in N, x \leq 4\}, B = \{y \mid y \in N, y \leq 3\}$

Represent $A \times B$ and $B \times A$ in a graph sheet . Can you see the difference between $A \times B$ and $B \times A$

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2. Given that $h(x) = f \circ g(x)$, fill in the table for h (x) `

x	$f(x)$
1	2
2	3
3	1
4	4

x	$g(x)$
1	2
2	4
3	3
4	1

x	$h(x)$
1	-
2	-
3	-
4	-

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Other Important Objective Type Questions

1. If $n(A \times B) = 24$ and $A = \{1, 3, 5, 7\}$ then n (B) is

   A. 8

   B. 4

   C. 5

   D. 6

Answer: D

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2. If the ordered pairs $(x + 1, 5)$ and $(4, x + 2y)$ are equal then (x,y) is:

   A. (1,1)

   B. (3,3)

   C. (3,1)

D. (1,3)

Answer: C

3. $A = (4, 5), B = (0, 1), C = (1, 4)$ then n $(A \times (B \cup C))$ is :

A. 3

B. 6

C. 9

D. 12

Answer: B

4. If $A = (3, 4)$ $B = (2, 3, 4)$ $C = (3, 4, 5)$ then $(B \times B) \cap (C \times C)$ is :

  A. $A \times A$

  B. $A \times B$

  C. $A \times C$

  D. $B \times C$

Answer: A

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5. Let A and B be two non empty sets. R be the relation for A to B . Then which is true?

  A. Domain of R = Codomain of R

  B. Domain or R is a proper subset of A

C. Range of R = domain of R

D. Range of R = $\{x \in A \mid x\,R\,y \text{ for some } y \in B\}$

Answer: B

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6. Let $f(x) = \dfrac{1}{x+1}$ Domain of y is :

A. R

B. R- (-1)

C. {-1}

D. cannot find the domain

Answer: B

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7. If A and B are finite sets such this n(A) =p, $n(B) = q$, then the total no, of functions that exists between A and B is :

A. q^p

B. p^q

C. pq

D. $\dfrac{p}{q}$

Answer: A

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8. If $n(A) = 8 : n(B) = 2$then the total no. of relation that exists between A and B is :

A. 128

B. 256

C. 64

D. 8

Answer: B

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9. The range of a function is a subset of its :

A. Co-domain

B. domain

C. relation

D. none of these

Answer: A

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10. Given $f(x) = 2x - x^2$ then $f(1) + f(2)$ is :

A. 4

B. -1

C. 0

D. 1

Answer: D

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11. Let $f(x) = 3x - 2$ find $\dfrac{f(x+2) - f(2)}{x}$

A. 0

B. 6

C. 3

D. 2

Answer: C

---

12. If f (x) $= 8x - 14$ find x such that $f(x) = x$.

A. 8

B. 2

C. 3

D. 4

Answer: B

---

13. Let f:$A \to B$ be a function such that f(A) =B . Then f is called

A. into function

B. many one function

C. one-one function

D. onto function

Answer: D

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14. let f be function $f: N \to N$ be defined by f $(x) = 4x + 3, x \in N$.

Then the pre image of 19 is :

A. 11

B. 4

C. 7

D. 9

Answer: B

---

15. Let f be a function from R to R defined by f (x) $= 2x - 3$ Find the value of a and b given that $(a, 1)(3, b)$ belongs to f.

   A. $(2, 3)$

   B. $(3, 2)$

   C. $(-2, -3)$

   D. $(-2, 3)$

Answer: A

16. The distance S (in kms) travelled by a particle in time t hours is given by $S(t) = \dfrac{t^2 + 3t}{2}$ The distance travelled in 3 hrs .

A. 5.5

B. 6

C. 9

D. 10

Answer: C

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17. If the function f: $R \to R$ is defined by f (x)
$$\begin{cases} 2x + 1 & x < -1 \\ x^2 - 1 & \le x < 3 \text{ Find} \\ 3x - 2 & x \ge 3 \end{cases} \quad \dfrac{f(-1) + f(3)}{2}$$

A. 8

B. 10

C. 12

D. 4

Answer: D

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18. Let A $=\{1, 2, 3, 4\}$ and $B = N$ .Let f : $A \to B$ be defined by f (x) $= x^2 + 1$ then the range of f is :

A. $(1, 4, 9, 16)$

B. $(2, 5, 10, 17)$

C. $(2, 3, 4, 5)$

D. $(1, 2, 3, 4)$

Answer: B

19. The function 't' which maps temperature in 'C' to 'F' is defined by t

© =F When F $= \dfrac{9}{5}$© $+ 32$ then the value of C then t(C) =230

A. 80

B. 90

C. 100

D. 110

Answer: D

20. If $f(x) = x^2 - 2$, $g(x) = 2x + 1$ then $f°g(x)$

A. $4x^2 - 4x + 1$

B. $4x^2 - 4x - 1$

C. $4x^2 + 4x + 1$

D. $4x^2 + 4x - 1$

Answer: D

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21. Find k if $f° f(k) = 13$ where f(k) =2k -1

A. 2

B. 4

C. 5

D. 3

Answer: B

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22. If $f(x) = 2x - 1$, $g(x) = \dfrac{x+1}{2}$, show that $fog = gof = x$.

A. 2x

B. x

C. $\dfrac{2x+1}{2}$

D. $\dfrac{2x-1}{2}$

Answer: B

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23. If $f(x) = x^2 - 7$, $g(x) = x - 4$ find a if $g°f(a) = 5$

A. 8

B. -6

C. 3

D. 4

Answer: D

---

24. If $(a, 7)(, (2, b)$ represents an identify function then the value of a and b respectively are :

A. $(7, 2)$

B. $(7, 7)$

C. $(2, 2)$

D. $(2, 7)$

Answer: A

25. If there are 512 relation from a set A =$\{1, 2, 3\}$ to a set B then the no. of elements in B is:

A. 2

B. 3

C. 4

D. 7

Answer: B

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