

Rg Academy-Polur

X –Maths Chapter 1&2 Expected 5 mark Questions

1. Relations and Functions

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

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

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

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

2. Let $A = \{x \in N \mid 1 < x < 4\}$, $B = \{x \in W \mid 0 \leq x < 2\}$ and $C = \{x \in N \mid x < 3\}$. then verify that

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

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

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

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

4. 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

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

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

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

(i) $\frac{f(0) + f(1)}{2}$

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

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

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

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

8. A function $f: [-5, 9] \rightarrow R$ is defined as follows : $f(x) = \begin{cases} 6x + 1 & \text{if } -5 \leq x < 2 \\ 5x^2 - 1 & \text{if } 2 \leq x < 6 \\ 3x - 4 & \text{if } 6 \leq x \leq 9 \end{cases}$ Find

(i) $f(-3) + f(2)$

(ii) $f(7) - f(1)$

(iii) $2f(4) + f(8)$

(iv) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$

9. If the function f is defined by $f(x) = \begin{cases} x + 2 & \text{if } x > 1 \\ 2 & \text{if } -1 \leq x \leq 1 \\ x - 1 & \text{if } -3 < x < -1 \end{cases}$; find the values of

(i) $f(3)$

(ii) $f(0)$

(iii) $f(-1.5)$

(iv) $f(2) + f(-2)$

10. If the function $f: \mathbb{R} \rightarrow \mathbb{R}$ is defined by $f(x) = \begin{cases} 2x + 7, & x < -2 \\ x^2 - 2, & -2 \leq x < 3 \\ 3x - 2, & x \geq 3 \end{cases}$, then find the values
- (i) $f(4)$ (ii) $f(-2)$ (iii) $f(4) + 2f(1)$ (iv) $\frac{f(1) - 3f(4)}{f(-3)}$
11. The function 't' which maps temperature in Celsius (C) into temperature Fahrenheit (F) is defined by $t(C) = F$ where $F = \frac{9}{5}C + 32$. Find,
- (i) $t(0)$ (ii) $t(28)$ (iii) $t(-10)$ (iv) the value of C when $t(c) = 212$
 (v) The temperature when the Celsius value is equal to the Fahrenheit value.
12. Let $f = \{(-1, 3), (0, -1), (2, -9)\}$ be a linear equation from z to z . find $f(x)$.
13. Let $f: A \rightarrow B$ be a function defined by $f(x) = \frac{x}{2} - 1$, where
 $A = \{2, 4, 6, 10, 12\}$, $B = \{0, 1, 2, 3, 5, 9\}$. Represent by
- (i) Set of Ordered pairs (ii) a table
 (iii) Arrow diagram (iv) a graph
14. Let $F: A \rightarrow B$ be a function defined by $f(x) = 3x - 1$, where
 $A = \{1, 2, 3, 4\}$, $B = \{2, 5, 8, 11, 14\}$. Represent by
- (i) Set of Ordered pairs (ii) a table
 (iii) Arrow diagram (iv) a graph
15. Find x if $gff(x) = fgg(x)$, given $f(x) = 3x + 1$ and $g(x) = x + 3$.
16. If $f(x) = 2x + 3$, $g(x) = 1 - 2x$ and $h(x) = 3x$. Prove $f \circ (g \circ h) = (f \circ g) \circ h$
17. Show that $(f \circ g) \circ h = f \circ (g \circ h)$ if $f(x) = x - 4$, $g(x) = x^2$ and $h(x) = 3x - 5$
18. Show that $(f \circ g) \circ h = f \circ (g \circ h)$ if $f(x) = x^2$, $g(x) = 2x$ and $h(x) = x + 4$
19. Show that $(f \circ g) \circ h = f \circ (g \circ h)$ if $f(x) = x - 1$, $g(x) = 3x + 1$ and $h(x) = x^2$
20. If $f: \mathbb{R} \rightarrow \mathbb{R}$ and $g: \mathbb{R} \rightarrow \mathbb{R}$ are defined by $f(x) = x^5$ and $g(x) = x^4$ then check if f, g are one - one and $f \circ g$ is one - one?

2. Numbers and sequences

- In an A.P., sum of four consecutive terms is 28 and their sum of their squares is 276. Find the four numbers.
- The sum of three consecutive terms that are in A.P., is 27 and their product is 288. find the three terms.
- The ratio of 6th and 8th term of an A.P is 7:9 .find the ratio of 9th term to 13th term.
- In a winter season let us take the temperature of Ooty from Monday to Friday to be in A.P. the sum of temperatures from Monday to Wednesday is 0°C and the sum of the temperatures from Wednesday to Friday is 18°C. find the temperature on each of five days.

5. Priya earned Rs.15, 000 in the first month. Thereafter her salary increased by Rs.1500 per year. Her expenses are Rs.13, 000 during the first year and the expenses increases by Rs.900 per year .How long will it take for her to save Rs.20, 000 per month
6. How many terms of the series $1 + 5 + 9 + \dots$ must be taken so that their sum is 190?
7. The 13th term of an A.P.is 3 and the sum of first 13 terms is 234.Find the common difference and the sum of first 21 terms.
8. The sum of first n , $2n$ and $3n$ terms of an A.P. are S_1 , S_2 and S_3 respectively. Prove that $S_3=3(S_2-S_1)$.
9. The 104th term and 4th term of an A.P. are 125 and 0.Find the sum of first 35 terms.
10. Find the sum of all natural numbers between 602 and 902 which are not divisible By 4.
11. Raghu wish to buy a laptop. He can buy it by paying Rs.40, 000 cash or by giving it in 10 instalments as Rs.4800 in the first month, Rs.4750 in the second month, Rs.4700 in the third month and so on. If he pays the money in this fashion, find
- (i) Total amount paid in 10 instalments.
- (ii) How much extra amount that he has To pay than the cost?
12. A brick staircase has a total of 30 steps. The bottom step requires 100 bricks. Each successive step requires two bricks less than the previous step.
- (i) How many bricks are required for the top most step?
- (ii) How many bricks are required to build the stair case?
13. If $S_1, S_2, S_3, \dots, S_m$ are the sums of n terms of m A.P.'s whose first terms are 1, 2, 3... m and whose common differences are 1, 3, 5,, $(2m - 1)$ respectively, Then show that $S_1+S_2+S_3+\dots +S_m=\frac{1}{2}mn(mn+1)$
14. Find the sum $\left[\frac{a-b}{a+b} + \frac{3a-2b}{a+b} + \frac{5a-3b}{a+b} + \dots \right]$ to 12 terms
15. In a Geometric progression, the 4th term is $\frac{8}{9}$ and the 7th term is $\frac{64}{243}$.find the Geometric Progression.
16. The product of three consecutive terms of G.P. and their sum is $\frac{91}{3}$,Find the three terms.
17. In a G.P. the 9th term is 32805 and 6th term is 1215.find the 12th term.
18. In a G.P. the product of three consecutive terms is 27 and the sum of the product of Two terms taken at a time is $\frac{57}{2}$. Find the three terms.

19. A man joined a company as Assistant Manager. The Company gave him a starting salary of Rs.60, 000 and agreed to increase his salary 5% annually. What will be his salary after 5 years?
20. Sivamani is attending an interview for a job and the company gave two offers to him. Offer A: Rs.20, 000 to start with followed by a guaranteed annual increase of 6% for the first 5 years. Offer B: Rs.22, 000 to start with followed by a guaranteed annual increase of 3% for the first 5 years. What is his salary in the 4th year with respect to the offers A and B?
21. Find the sum to n terms of the series : $5+55+555+\dots$
22. Find the sum to n terms of the series: $0.4 + 0.44 + 0.444 + \dots$ to n terms
23. Find the sum to n terms of the series : $3 + 33 + 333 + \dots$ to n terms
24. Find the sum of the Geometric series : $3 + 6 + 12 + \dots + 1536$.
25. If $S_n=(x + y) +(x^2+xy+y^2) +(x^3+x^2y+xy^2+y^3) +\dots$ n terms then prove that $(x-y)$
$$S_n=\left[\frac{x^2(x^n-1)}{x-1} - \frac{y^2(y^n-1)}{y-1}\right]$$
26. Find the sum of: $15^2+16^2+17^2+\dots +28^2$
27. Rekha has 15 square colour papers of sizes 10 cm, 11 cm, 12 cm,..., 24 cm. How much area can be decorated with these colour papers?
28. The sum of the squares of the first n natural numbers is 285, while the sum of their Cubes is 2025. Find the value of n
29. Find the sum of the series $(2^3-1) + (4^3-3^3) + (6^3-15^3) +\dots$ to
(i) n terms (ii) 8 terms.
30. If $(m + 1)^{\text{th}}$ term of an A.P. is twice the $(n + 1)^{\text{th}}$ term, then prove that $(3m + 1)^{\text{th}}$ term is twice the $(m + n + 1)^{\text{th}}$ term

Prepared by
Mr.Renugopal (Rg Sir)
BT. Assistant in Maths
Pinkz Public School-Kasthambadi.
Tiruvannamalai.

*****All the best*****

kindly send me your key Answers to our email id - padasalai.net@gmail.com