MATH KINGMAKER
Question Paper : Set - A
Chapters : 4,3,2

Date : 11-07-2021 Subject : Maths Total Marks : 50

[PART - B]

Q - 1 : **[Section A] - Answer the following for 1 Mark.** **[17]**

(1) The maximum value of the expression $\sin^6\theta + \cos^6\theta$ is.....

(2) Let A = {a, b, c}. The total number of distinct relation that can be defined over A is ....

(3) The range of $f : R \to R = f(x) = 1000$ is ....

(4) Domain of a relation S : A → B is .....

(5) Find the radian measures corresponding to the 25° egree measures.

(6) Let A = {1, 2, 3, 4} and B = {5, 7, 9}. Determine: Is A × B = B × A ?

(7)

$\frac{1-\sin\theta+\cos\theta}{1-\sin\theta-\cos\theta} = ...$

(8) Let $f : R \to R, f(x) = [x] - x$. Range of f is .....

(9)

Value of $\cos\left(\frac{11\pi}{6}\right)$ .....

(10)

If $f : R \to R, f(x) = (a - x^n)^{\frac{1}{n}}$ where a > 0 and n ∈ N, then $f(f(x))$ = ...

(11) State True or False : The ordered pair (5, 2) belongs to the relation R = {(x, y) : y = x - 5, x, y ∈ Z}

(12)

Value of $\cot\left(-\frac{15\pi}{4}\right)$ is .....

(13) Let A = {1, 2, 3} and B = {2, 3, 5}, then which of the following relation is a functions from A to B ?

(14) 240° = ...$^{\text{Radian}}$

(15)

Let $f : R - \{-2\} \to R, f(x) = \frac{x+2}{|x+2|}$ Range of f is .....

(16)

The value of $\sqrt{3}\sin 75° - \cos 75°$ is .....

(17)

The value of $\sqrt{3}\,\text{cosec}\,20° - \sec 20°$ is .....

Q - 2 : **[Section B] - Answer the following for 2 Mark.** **[16]**

(18) If f and g are real functions defined by $f(x) = x^2 + 7$ and $g(x) = 3x + 5$, find $f(1/2) \times g(14)$

(19) Find the domain of each of the following functions.

(i) $f(x) = \frac{x}{x^2 + 3x + 2}$ (ii) $f(x) = [x] + x$

(20) Prove : $(\sin\alpha - \cos\alpha)(\sin\beta + \cos\beta) = \sin(\alpha - \beta) - \cos(\alpha + \beta)$

(21) Prove that $(2n + 7) < (n + 3)^2, \forall\ n \in N$.

(22) Prove that dividing $(4)^{n-3n}$ by 9 the reminder is 1, $\forall\ n \in N$.

(23) $\frac{\tan^2\theta(\operatorname{cosec}\theta-1)}{1+\cos\theta}-\frac{(1-\cos\theta)\operatorname{cosec}^2\theta}{\operatorname{cosec}\theta+1}=\ldots\ldots$

(24)

If $0<0<\frac{\pi}{2}\cos\theta=\frac{3}{5}$ then find the value of $\cos 2\theta, \sin 2\theta$.

(25)

If $f:R-\{-1\}\to R-\{-1\}, f(x)=\frac{1-x}{1+x}$, then $fof(x)=\ldots\ldots$

Q - 3 : **[Section C] - Answer the following for 3 Mark.** **[12]**

(26) For a convex quadrilateral ABCD, prove that sin (A + B) + sin (C+ D)= sin (B + C) + sin (A + D). For a convex quadrilateral ABCD, A + B + C + D = 2π

(27) Prove : $10^n + 3 \cdot 4^{n+2} + 5$ is divisible by 9.

(28) Let A = {1, 2}, B = {1, 2, 3, 4}, C = {5, 6} and D = {5, 6, 7, 8}. Verify that
(i) $A \times (B \cap C) = (A \times B) \cap (A \times C)$ (ii) $A \times C$ is a subset of $B \times D$

(29)

Prove $1^3+2^3+3^3+\ldots+n^3=\frac{n^2(n+1)^2}{4}, n\in N$

Q - 4 : **[Section D] - Answer the following for 5 Mark.** **[5]**

(30) For ΔABC, prove $a^3 \sin(B - C) + b^3 \sin(C - A) + c^3 \sin(A - B) = 0$