**MATH**

**PAGEMAKER10**

**Function**

Q1. Solve (2x+1)(x–3)(x+7) < 0

(a) (–, –6)

(b) (1, 4)

(c) (10, 12)

(d) (

L1Difficulty1

Qtag Mathematics

Qcreator Pagemaker10

Q2. Solve < 3

(a) (

(b) (

(c) (0, 1)

(d) none

L1Difficulty1

Qtag Mathematics

Qcreator Pagemaker10

Q3. Find the domain of

(a) [

(b) (1, )

(c) (

(d) none

L1Difficulty1

Qtag Mathematics

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Q4. Find the range of

(a) [1, 3)

(b) (3, 10)

(c) [,

(d) none of these

L1Difficulty1

Qtag Mathematics

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Q5. Solve 2

(a) ( [

(b) (

(c) (

(d) none

L1Difficulty1

Qtag Mathematics

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Q6. Find the number of solution of the equation sin x =

(a) 0

(b) 1

(c) 2

(d) 3

L1Difficulty1

Qtag Mathematics

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Q7. Find the range of

(a) [1,

(b) [2, 4]

(c) [5, 6]

(d) none

L1Difficulty1

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Q8. Which of the following even function

(a) x2 sin x

(b)

(c)

(d)

L1Difficulty1

Qtag Mathematics

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Q9. Period of cos(cos x) + cos(sin x)

(a)

(b) 0

(c)

(d) none

L1Difficulty1

Qtag Mathematics

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Q10. is one-one or onto

(a) bijective

(b) only one-one

(c) only onto

(d) neither one-one nor onto

L1Difficulty1

Qtag Mathematics

Qcreator Pagemaker10

**Solutions**

S1. Ans. (d)

Sol.

 – + – +

 –7 3

(–, –7) (, 3)

S2. Ans. (a)

Sol.

 < 3

 – 3 < 0

 < 0

|  |  |
| --- | --- |
|  > 0 |  + – + 0  |

(–, 0) (, )

S3. Ans. (a)

Sol.

f(x) =

1– 0

 1

1 – 0

1 – x2 0

x2

(x – 1)(x + 1) 0

[–1, 1]

S4. Ans. (c)

Sol.

f(x) = x2 – x – 3

f(x) = (x – )2

[, ]

S5. Ans. (a)

Sol.

||x – 1| – 5| 2

|x – 1| – 5 –2 or |x – 1| – 5 2

|x – 1| 3 or |x – 1| 7

–3 x – 1 3 or x – 1 7 or x – 1

–2 x 4 or x –6 or x – 1

S6. Ans. (a)

Sol.



g(x) = x2 + x + 1 = (x + )2 +

no intersect so no-solution.

S7. Ans. (a)

Sol.

f2(x) = sin2x + cos2x + |2 sin x cos x|

f2(x) = 1 + |sinx|

[1,

S8. Ans. (d)

Sol.

f(x) = f(–x) even only (d) option is correct.

S9. Ans. (a)

Sol.

cos(cos( cos(sin(

cos sin x + cos cos x

f(x + T) = f(x)

S10. Ans. (a)

Sol.

f(x) = sin

****

graph shows f(x) is one-one and onto as range = co-domain.

**Level 2**

Q1.

(a) (5, )

(b) [

(c) [

(d) [

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q2. Solve (x2

(a) (1,

(b) (1,

(c) [1,

(d) none

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q3. The range of the function

(a) [6, )

(b) (

(c) (

(d) (0, 1)

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q4. Find the range of

(a) [1, 5)

(b) [2, 6]

(c) (1, 5)

(d) [2, 2

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q5. Find the No. of solution sin x =

(a) 7

(b) 8

(c) 9

(d) 10

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q6. Find the domain of [x}, is greatest integer

(a) [2, 10]

(b) [1, 5)

(c) (

(d) none

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q7. = log(x+ is which type of function

(a) odd function

(b) even function

(c) neither even nor odd

(d) none

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q8. Period of

(a) 1

(b) 3

(c) 2

(d) 4

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q9. If 3x and (gofx = x – 2 then g(x) is

(a)

(b)

(c)

(d) none

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

Q10. Period of is

(a) not periodic

(b) 1

(c) 2

(d) 4

L3Difficulty3

Qtag Mathematics

Qcreator Pagemaker10

**Solutions**

S1. Ans. (b)

Sol.

f(x) =

f(x) =

= | |

S2. Ans. (a)

Sol.

lox2 0

if x > 1, then

0 < x2 – 1 < 1

1 < x2 2

[– (1, ]

(1, ]

0 < x < 1 x2 – 1 1 x2 2

x (, [, )

x

x (1, ]

S3. Ans. (a)

Sol.

= ( + ( + 6 6

[6, ]

S4. Ans. (d)

Sol.

y =

y2 =

y2

y2

y2 minimum 4 maximum 8

[2, 2}

S5. Ans. (a)

Sol.

f(x) = sin x g(x) =

–1 sin x 1, –1 1

x [

****

S6. Ans. (b)

Sol.

f(x) =

[x] and

1 or 1 x 5

S7. Ans. (a)

Sol.

f(x) = log(x +

= log(

= log

= log

=

odd function

S8. Ans. (c)

Sol.

tan = tan

[x]

period 2(least positive value)

S9. Ans. (a)

Sol.

f(x) = 3x – 2

(x) =

(gof

(x

g(x

S10. Ans. (a)

Sol.

sin x period 2

{x} period 1

Hence L.C.M. of 2 and 1 not exit, not periodic.

**LEVEL-III**

Q1. The number of points in (, for which x2 – xsinx –cosx = 0, is

(a) 6

(b) 4

(c) 2

(d) 0

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q2. [1, 29], defined by f(x) = 2x3 – 15x2 + 36x + 1, is

(a) one-one and onto

(b) onto but not one-one

(c) one-one but not onto

(d) neither one-one nor onto

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q3. and g(x) = sinx for all x . Then the set of all x satisfying (fogogof) (x) = (gogof) (x), where (fog) (x) = f(g(x)), is

(a) ±, n {0, 1, 2, ......}

(b) ±, n {1, 2, ......}

(c) , n {...., ......}

(d) , n {...., ......}

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q4. If f"(x) = –f(x) and g(x) = f'(x) and F(x) = +and given that F(5) = 5, then F(10) is equal to

(a) 5

(b) 10

(c) 0

(d) 15

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q5. If the functions f(x) and g(x) are defined on RR such that

f(x) = , g(x) = , then (f – g)(x) is

(a) one-one and onto

(b) neither one-one nor onto

(c) one-one but not onto

(d) onto but not one-one

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q6. X and Y are two sets and f : X Y. If f(c) = {y; c X, y Y} and f–1(d) = {x; dY, x X}, then the true statement is

(a) f(f–1(b)) = b

(b) f–1(f(a)) = a

(c) f(f–1(b)) = b, b y

(d) f–1(f(a)) = a, a x

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q7. sin x + cos x, g(x) = x2 – 1, then g(f(x)) is invertible in the domain

(a)

(b)

(c)

(d) [0,

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q8. If f : [0, ) [0, ), and f(x) = then f is

(a) one-one and onto

(b) one-one but not onto

(c) onto but not one-one

(d) neither one-one nor onto

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q9. Range of the function f(x) = ; x R is

(a) (1, )

(b) (1, 11/7]

(c) (1, 7/3]

(d) (1, 7/5)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

Q10. Domain of definition of the function f(x) = for real valued, x is

(a)

(b)

(c)

(d)

L5Difficulty5

Qtag Mathematics

Qcreator Pagemaker10

**Solutions**

S1. Ans. (c)

Sol.

Let f(x) = x2 – x sin x – cos x f'(x) = 2x – x cos x

f(x)

f(x)

f(0) = –1

Hence 2 solutions.

S2. Ans. (b)

Sol.

f(x) = 2x3 – 15x2 + 36x + 1

f'(x) = 6x2 – 30x + 36

= 6 (x2 – 5x + 6)

= 6 (x – 2) (x – 3)

f(x) is increasing in [0, 2] and decreasing in [2, 3]

f(x) is many one

f(0) = 1

f(2) = 29

f(3) = 28

Range is [1, 29]

Hence, f(x) is many-one-onto

S3. Ans. (a)

Sol.

(fogogof) (x) = sin2 (sin x2)

(gogof) (x) = sin (sin x2)

 sin2 (sin x2) = sin (sin x2)

 sin (sin x2) [sin (sin x2) – 1] = 0 sin (sin x2) = 0 or 1

 sin x2 = n or 2m + /2, where m, n I

 sin x2 = 0

 x2 = n = ± , n {0, 1, 2, ...}.

S4. Ans. (a)

Sol.

f"(x) = –f(x) and f'(x) = g(x) f"(x) . f'(x) + f(x) . f'(x) = 0

 f(x)2 + (f'(x))2 = c (f(x)2 + (g(x))2 = c F(x) = c.

S5. Ans. (a)

Sol. Let h(x) = f(x) – g(x) = the function h(x) is one-one and onto.

S6. Ans. (d)

Sol.

The given data is shown in the figure

Since

 f(x) = d

Now, if a x, f(a) d

 = a.

S7. Ans. (b)

Sol.

g(f(x)) = (sin x + cos x)2 – 1 = sin 2x which is invertible in .

S8. Ans. (b)

Sol.

f'(x) = > 0 x [0, ) and range [0, 1) function is one-one but not onto

S9. Ans. (c)

Sol.

f(x) = 1 + Range = (1, 7/3].

S10. Ans. (a)

Sol.

– sin–1(2x) 2x 1 x .