MATHS

BOOKS - ARIHANT MATHS (HINGLISH)

GRAPHICAL TRANSFORMATIONS

Exercise

1. Plot $y = |x| \text{ and } y = |x| + 2.$

Watch Video Solution

2. Plot $y = |x| \text{ and } y = |x| - 2.$

Watch Video Solution

3. Plot $y = e^x, y = e^x + 1$ and $y = e^x - 1$.

Watch Video Solution

4. Plot $y = |x|$ and $y = |x - 2|$

Watch Video Solution

5. Plot $y = |x|$ and $y = |x + 2|$

Watch Video Solution

6. Plot $y = \sin\left(x + \frac{\pi}{4}\right)$ and $y = \sin\left(x - \frac{\pi}{4}\right)$.

Watch Video Solution

7. Plot $y = \sin x$ and $y = 2\sin x$.

Watch Video Solution

8. Plot $y = \sin x$ and $y = \frac{1}{2}\sin x$.

Watch Video Solution

9. Plot $y = \sin x and y = \sin 2x$.

Watch Video Solution

10. Plot $y = \sin x and y = \frac{\sin x}{2}$

Watch Video Solution

11. Draw the graph of $y = e^{-x}$, when the graph of $y = e^{x}$ is known.

Watch Video Solution

12. Draw graph of $y = \log(-x)$, when the graph of $y = \log(x)$ is given.

Watch Video Solution

13. Draw the graph of $y = -e^x$ when the graph of $y = e^x$ is known.

Watch Video Solution

14. Draw the graph of $y = -\log(x)$ when the graph of $y = \log x$ is known.

Watch Video Solution

15. Draw the graph of $y = |\log x|$ when the graph of $y = \log(x)$ is known.

Watch Video Solution

16. Draw the graph of $y = \log|x|$ when the graph of $y = \log(x)$ is known.

Watch Video Solution

17. Draw the graph of $y = \left||x|^2 - 2|x| - 3\right|$, if the graph for $y = x^2 - 2x - 3$ is given.

Watch Video Solution

18. Draw graph for $|y| = (x - 1)$.

Watch Video Solution

19. Draw the graph for $|y| = (x-1)(x-2)$.

Watch Video Solution

20. Draw the graph of $y = [x^3]$,

when $-2^{1/3} \leq x \leq 2^{1/3}$

Watch Video Solution

21. Draw the graph of $y = [\sin x]$.

Watch Video Solution

22. Draw the curve $y = e^{[x]}$

Watch Video Solution

23. Draw the graph for $y = (\{x\} - 1)^2$.

Watch Video Solution

24. Plot $y = x + \sin x$.

Watch Video Solution

25. Plot $y = |x| - 2$ and hence $f(x) = \dfrac{1}{|x| - 2}$

Watch Video Solution

26. Let $f(x) = \begin{cases} x \sin. \frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$ and $g(x) = \begin{cases} x^2 \sin. \frac{1}{x}, & x \neq 0 \\ 0, & x = 0 \end{cases}$

Discuss the graph for f(x) and g(x), and evaluate the continuity and differentiabilityof f(x) and g(x).

Watch Video Solution

27. Draw graph for $y = \max\{2x, x^2\}$ and discuss the continuity and diffrentiablity.

Watch Video Solution

28. Draw the graph for $y = |2 - |x - 1||$.

Watch Video Solution

29. Let $h(x) = \min\{x, x^2\}$, for every real number of X. Then (A) h is continuous for all x (B) h is differentiable for all x (C) $h'(x)$ = 1, for all x > 1 (D) h is not differentiable at two values of x

Watch Video Solution

30. The number of real solution of the equation $e^x + x = 0$, is

A. 0

B. 1

C. 2

D. None of these

Answer:

Watch Video Solution

31. The number of real solutions of the equation $\log_a x = |x|, 0 < a < 1$, is

A. 0

B. 1

C. 2

D. None of these

Answer:

Watch Video Solution

Watch Video Solution

32. number of solution of the equation $|x| = \cos x$

A. 0

B. 1

C. 2

D. 3

Answer:

Watch Video Solution

33. How many roots does the following equation possess $3^{|x|}(|2 - |x| \; |) = 1$?

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

34. The number of real solution of the equation

$x^2 = 1 - |x - 5|$ is

A. 1

B. 2

C. 4

D. None of these

Answer:

Watch Video Solution

35. Number of solutions $2^{\sin(|x|)} = 4^{|\cos x|} \in [-\pi, \pi]$ is equal to

A. 2

B. 4

C. 6

D. 8

Answer:

Watch Video Solution

36. Number of roots of $|\sin|x|| = x + |x|\text{in}[-2\pi, 2\pi]$, is

A. 2

B. 3

C. 4

D. 6

Answer:

Watch Video Solution

37. The equation $3^{x-1} + 5^{x-1} = 34$ has

A. one solution

B. two solutions

C. three solutions

D. four solutions

Answer:

Watch Video Solution

38. Number of solutions of the equation $\cos[x] = e^{2x-1}$, $x \in [0, 2\pi]$, where[.] denotes the greatest integer function is

A. 1

B. 2

C. 3

D. 4

Answer:

Watch Video Solution

39. Let $g(x) = \sqrt{x - 2k},\ \forall 2k \leq x < 2(k+1)$ where, $k \in l$, then

A. $g(x) = \sqrt{x+2},\ -2 \leq x < 0$

B. $g(x) = \sqrt{x-2}, 2 \leq x < 4$

C. $g(x) = \sqrt{x}, 0 \leq x < 2$

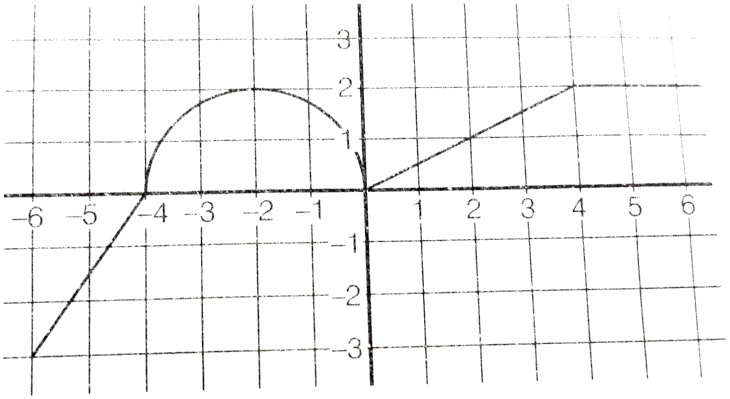
D. period of g(x) is 2.

Answer:

Watch Video Solution

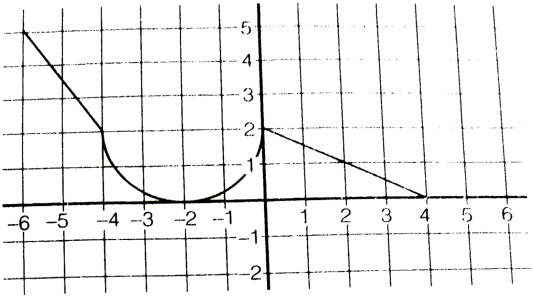
Watch Video Solution

40. The graph of f(x) is given below.

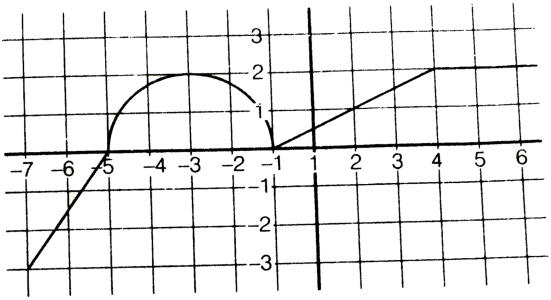


Then, (a) Graph of $-f(x)+2$ is

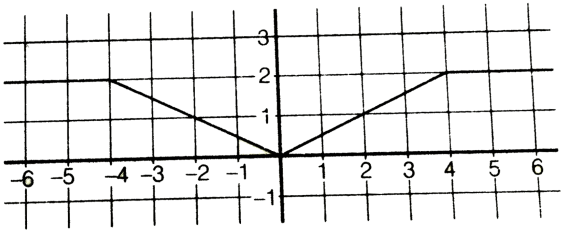
Then, (a) Graph of $-f(x)+2$ is



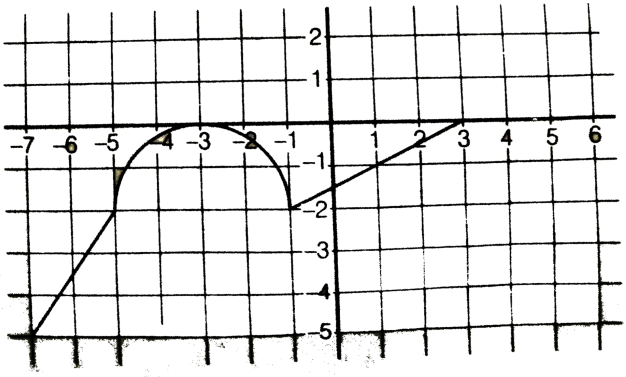
(b) Graph of $-f(x-1)$ is



(c) Graph of $f(|x|)$ is



(d) Graph of $f(x+1)-2$ is



A. Then, (a) Graph of $-f(x)+2$ is

B. Graph of $-f(x-1)$ is

C. Graph of $f(|x|)$ is

D. Graph of $f(x+1)-2$ is

Answer:

Watch Video Solution

41. The number of solutions of the equation $[y+[y]]=2\cos x$, where $y=\frac{1}{3}[\sin x+[\sin x+[\sin x]]]$ (where [.] denotes the greatest integer function) is

Watch Video Solution

42. The sum of the roots of the equation $\cos^{-1}(\cos x)=[x]$. where $[x]$ denotes greatest integer function, is

Watch Video Solution

43. Sketch the graph of $y=\log_{0.5}|x|$.

Watch Video Solution

44. Sketch the graph of $y = \left| \left| \frac{1}{x} \right| - 3 \right|$.

Watch Video Solution

45. Find the number of solutions of the equations $y = |\sin x|$ and $x^2 + y^2 = 1$.

Watch Video Solution

46. Find the number of solutions of $4\{x\} = x + [x]$.

Watch Video Solution

47. Sketch the graph of $\left| \sin x + \frac{1}{2} \right|$.

Watch Video Solution

48. Sketch the graph of $y = \frac{2^x}{2^{[x]}}$

Watch Video Solution

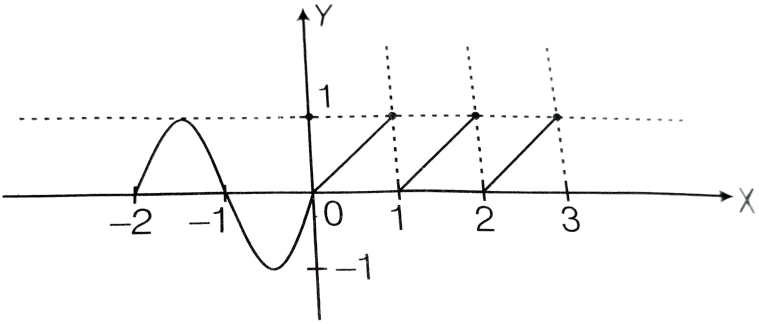
49. Sketch the region for $y = \sin(x - [x])$.

Watch Video Solution

50. Sketch the region for $|y \models \sin x$.

Watch Video Solution

51. Consider the following function f whose graph is given below.

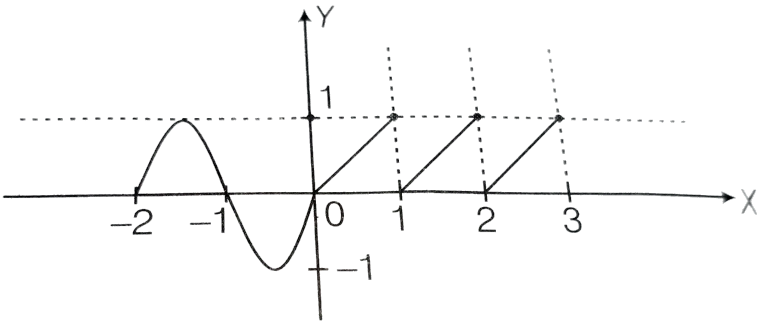


Draw the graph of following functions.

(a) $f(x) + 1$

Watch Video Solution

52. Consider the following function f whose graph is given below.

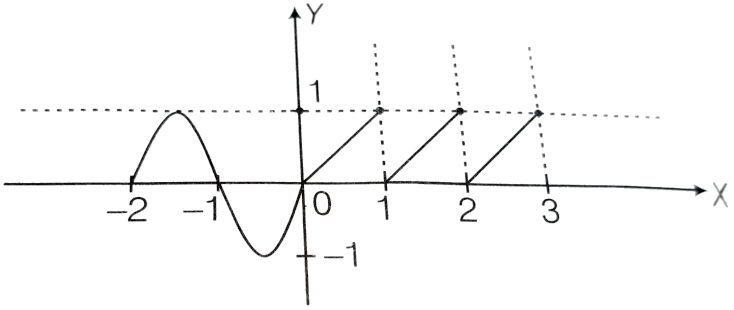


Draw the graph of following functions.

(b) $f(x) - 1$

Watch Video Solution

53. Consider the following function f whose graph is given below.

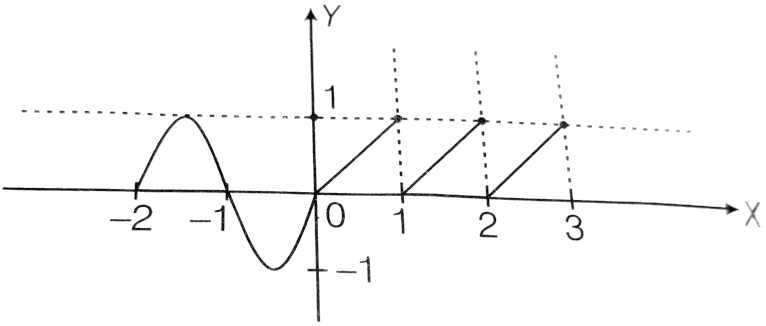


Draw the graph of following functions.

(c) $-f(x)$

Watch Video Solution

54. Consider the following function f whose graph is given below.

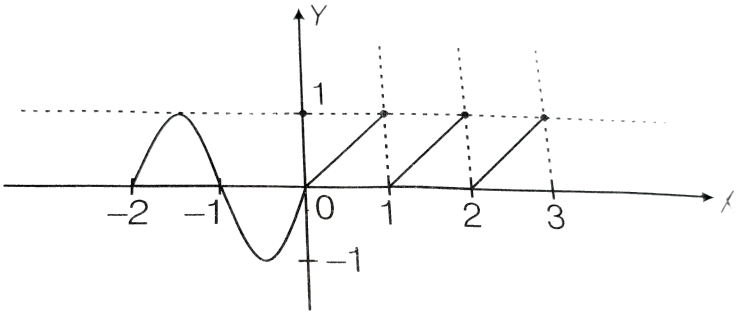


Draw the graph of following functions.

(d) $|f(x)|$

Watch Video Solution

55. Consider the following function f whose graph is given below.

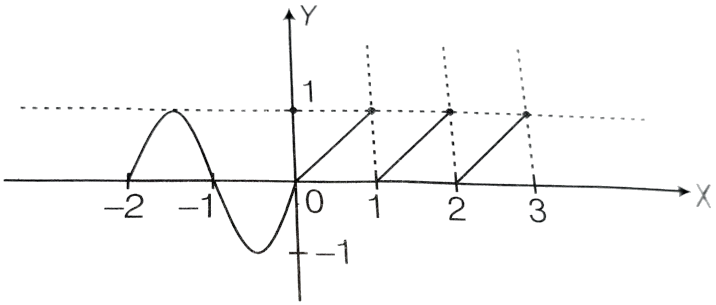


Draw the graph of following functions.

(e) $f(-x)$

Watch Video Solution

56. Consider the following function f whose graph is given below.

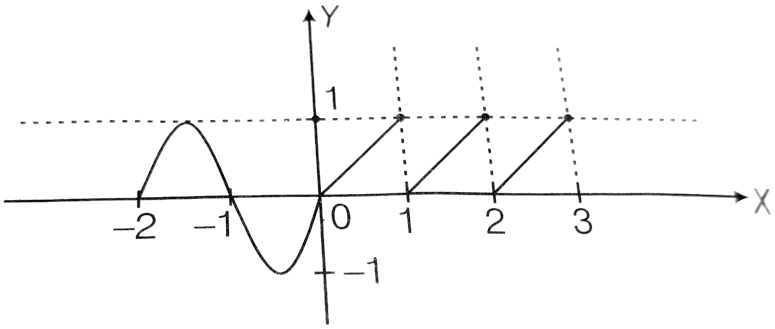


Draw the graph of following functions.

(f) $f(|x|)$

Watch Video Solution

57. Consider the following function f whose graph is given below.

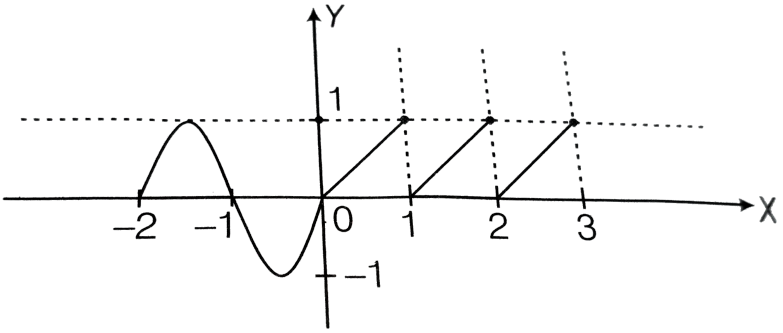


Draw the graph of following functions.

(g) $2f(x)$

Watch Video Solution

58. Consider the following function f whose graph is given below.

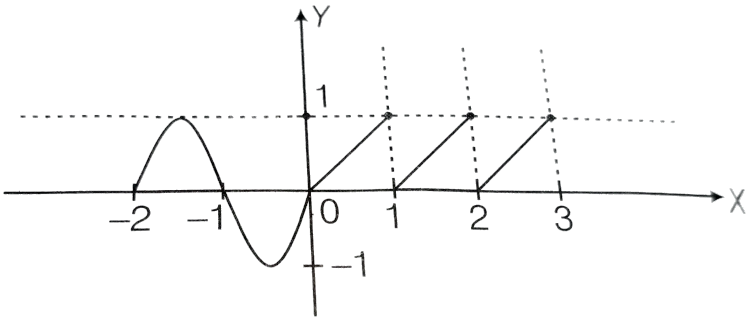


Draw the graph of following functions.

(h) $f(2x)$

Watch Video Solution

59. Consider the following function f whose graph is given below.

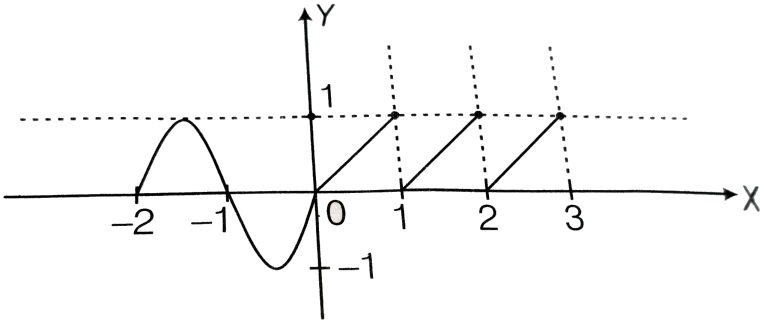


Draw the graph of following functions.

(i) $[f(x)]$

Watch Video Solution

60. Consider the following function f whose graph is given below.



Draw the graph of following functions.

(g) $f(x-[x])$

Watch Video Solution

61. Sketch the graph of $y = \max(\sin x, \cos x), \forall x \in \left(-\pi, \frac{3\pi}{2}\right)$.

Watch Video Solution

62. Sketch the graph for $y = \min\{\tan x, \cot x\}$.

Watch Video Solution

63. Sketch the graph of $y = \min\{|x|, |x-1|, |x+1|\}$.

Watch Video Solution

64. Sketch the graph of $y = \sin^{-1} x,\ \forall x \in [-1, 1]$.

Watch Video Solution

65. Sketch the graph for $y = \cos^{-1} x,\ \forall x \in [-1, 1]$.

Watch Video Solution

66. Sketch the graph for $y = \tan^{-1} x,\ \forall x \in R.$

Watch Video Solution

67. Sketch the graph for $y = \sin^{-1}(\sin x).$

Watch Video Solution

68. Sketch the graph for $y = \cos^{-1}(\cos x).$

Watch Video Solution

69. Sketch the graph for $y = \tan^{-1}(\tan x).$

Watch Video Solution

70. Find the value of x graphically which satisfy $\left|\frac{x^2}{x-1}\right| \leq 1.$

Watch Video Solution

71. Find the values of x graphically satisfying $[x] - 1 + x^2 \leq 0$ where $[.]$ denotes the greatest integer function.

Watch Video Solution

72. Find the values of x graphically which satisfy, $-1 \leq [x] - x^2 + 4 \leq 2$, where $[.]$ denotes the greatest

integer function.

Watch Video Solution

73. Find the number of solutions of $2\cos x = |\sin x|$ when $x \in [0, 4\pi]$.

Watch Video Solution

74. Sketch the curves

(i)$y = \sqrt{x - [x]}$

(where [.] denotes the greatest integer function).

Watch Video Solution

75. Sketch the curves

(ii) $y = [x] + \sqrt{x - [x]}$

(where [.] denotes the greatest integer function).

Watch Video Solution

76. Sketch the curves

(iii) $y = \left|[x] + \sqrt{x - [x]}\right|$

(where [.] denotes the greatest integer function).

(where [.] denotes the greatest integer function).

Watch Video Solution

Exercise For Session 1

1. Plot the following functions.

$y = x^2 + 1$

Watch Video Solution

2. Plot the following functions.

$y = x^2 - 1$

Watch Video Solution

3. Plot the following functions.

$y = x^3 + 1$

Watch Video Solution

4. Plot the following functions.

$y = x^3 - 1$

Watch Video Solution

5. Plot the following functions.

$y = \sin x + 1$

Watch Video Solution

6. Plot the following functions.

$y = \sin x - 1$

Watch Video Solution

7. Plot the following functions.

$y = (\log_e x) + 1$

Watch Video Solution

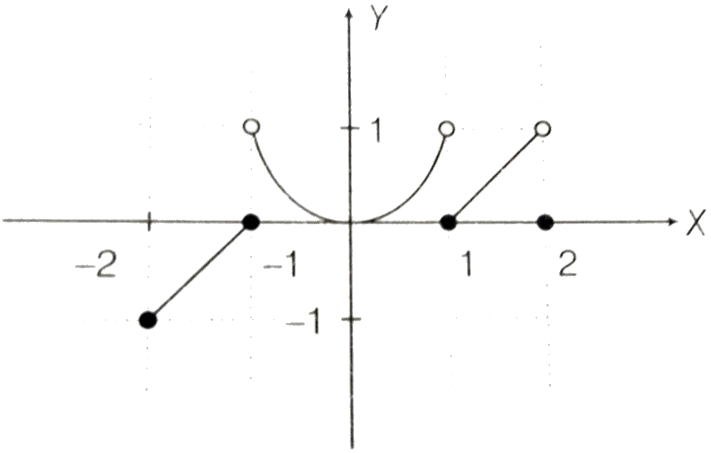
8. Plot the following functions.

$y = (\log_e x) - 1$

Watch Video Solution

Exercise For Session 2

1. Consider the following function f whose graph is given below.



Watch Video Solution

2. Draw the graph of the following function.

$f(x+1)$

View Text Solution

3. Draw the graph of the following function.

$f(x-1)$

View Text Solution

4. Draw the graph of the following function.

$-f(x)$

View Text Solution

5. Draw the graph of the following function.

$f(-x)$

Watch Video Solution

6. Draw the graph of the following function.

$2f(x)$

Watch Video Solution

7. Draw the graph of the following function.

$\frac{1}{2} f(x)$

Watch Video Solution

8. Draw the graph of the following function.

$f(2x)$

Watch Video Solution

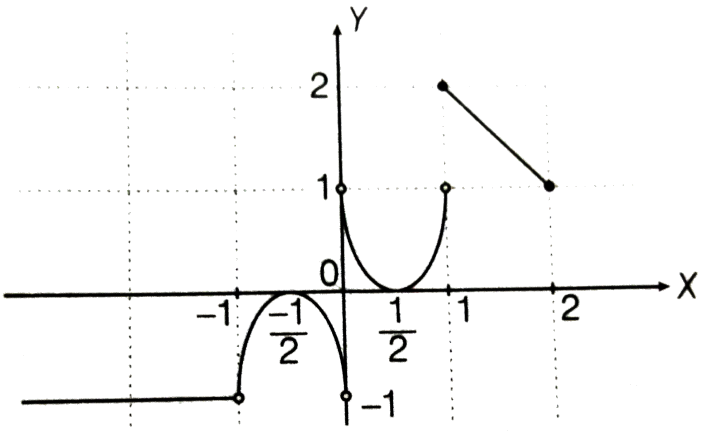
9. Draw the graph of the following function.

$f\left(\frac{x}{2}\right)$

View Text Solution

Exercise For Session 3

1. Consider the following function f, whose graph is given below.



Draw the graph of the following functions.

(i) $|f(x)|$

(ii) $f(|x|)$

(iii) $|f(|x|) - 1|$

Watch Video Solution

Watch Video Solution

2. Plot the following.

$y = |x^2 - 2x - 3|$

Watch Video Solution

3. Plot the following.

$y = x^2 - 2|x| - 3$

Watch Video Solution

4. Plot the following.

$y = |\log_2 x|$

Watch Video Solution

5. Plot the following.

$y = |\log_2|x||$

Watch Video Solution

6. Plot the following.

$y = \log_2|1 - x|$

Watch Video Solution

7. Plot the following.

$y = \log_2 (2 - x)^2$

Watch Video Solution

8. Plot the following.

$y = |\cos|x\ |\ |$

Watch Video Solution

9. Plot the following.

$y = \left|2 - 2^2\right|$

Watch Video Solution

10. Plot the following.

$y = \sin(|x|)$

Watch Video Solution

11. Plot the following.

$y = |\cos|x\ ||$

Watch Video Solution

12. Plot the following.

$|f(x)| = \log_e x$

Watch Video Solution

13. Plot the graph (i) $|f(x)| = \log_2(-x)$

Watch Video Solution

14. Find the number of solutions of $\sin \pi x = |\log_2(-x)|$

Watch Video Solution

15. Find the number of solutions of

$2^{|x|} = \sin x^2$

Watch Video Solution

16. Find the number of solutions of the equation $\sin x = x^2 + x + 1.$

Watch Video Solution

Exercise For Session 4

1. Plot the following, where [.] denotes integer function.

$f(x) = \left[x^2\right], \quad \text{whe} \quad -2 \leq x \leq 2$

Watch Video Solution

2. Plot the following, where [.] denotes integer function.

$f(x) = [|x|]$

Watch Video Solution

3. Plot the following, where [.] denotes integer function.

$f(x) = [|x - 2|].$

Watch Video Solution

4. Plot the following, where [.] denotes integer function.

$f(x) = [|x| - 2]$

Watch Video Solution

5. Plot the following. $f(x) = \sin^{-1}(\sin|x|)$

Watch Video Solution

6. Plot the following, where [.] denotes integer function.

$f(x) = \left[\cos^{-1} x\right]$

Watch Video Solution

7. Plot the following, where [.] denotes integer function.

$f(x) = \cos(x - [x])$

Watch Video Solution

8. Plot the following, where [.] denotes integer function.

$f(x) = \left[\sin^{-1}(\sin x)\right]$

Watch Video Solution

9. Plot the graph for $f(x) = \min(x - [x],\ -x - [-x])$.

Watch Video Solution

10. Find the area enclosed by the curves

$$\max(|x|, |y|) = 1$$

Watch Video Solution

11. Find the area enclosed by the curves

$$\max(2|x|, 2|y|) = 1$$

Watch Video Solution

12. Find the area enclosed by the curves

$$\max(|x+y|, |x-y|) = 1$$

Watch Video Solution

Exercise Single Option Correct Type Questions

1. The number of real solutions of the equation $e^{|x|} - |x| = 0$, is

A. 0

B. 1

C. 2

D. None of these

Answer: a

Watch Video Solution

2. The number of real solutions of the equation $3^{-|x|} - 2^{|x|} = 0$, is

A. 0

B. 1

C. 2

D. 3

Answer: c

Watch Video Solution

3. The number of solutions of $3^{|x|} = |2 - |x||$, is

A. 0

B. 2

C. 4

D. infinite

Answer: B

Watch Video Solution

4. The total number of roots of the equation $\left|x - x^2 - 1\right| = \left|2x - 3 - x^2\right|$ is

A. 0

B. 1

C. 2

D. infinity many

Answer: C

Watch Video Solution

5. The equation $e^x = m(m+1), m < 0$ has

A. no real root

B. exactly one real root

C. two real root

D. None of the above

Answer: B

Watch Video Solution

6. The number of real solutions of the equation $1 - x = [\cos x]$ is

A. 1

B. 2

C. 3

D. 4

Answer: B

Watch Video Solution

7. The number of roots of the equation $1 + 3^{\frac{x}{2}} = 2^x$ is

A. 0

B. 1

C. 2

D. Noe of the above

Answer: B

Watch Video Solution

Exercise More Than One Correct Option Type Questions

1. The equation $x^2 - 2 = [\sin x], where[.]$ denotes the greatest integer function, has

A. infinity many roots

B. exactly one integer root

C. exactly one irrational root

D. exactly two roots

Answer: B::C::D

Watch Video Solution

2. Consider the function $f(x) = \begin{cases} x - [x] - \frac{1}{2} & x \notin \\ 0 & x \in I \end{cases}$

where [.] denotes the fractional integral function and I is the set of integers. Then find $g(x)$ max . $\left[x^2, f(x), |x|\right\}, -2 \leq x \leq 2.$

A. $x^2, -2 \leq x \leq -1$

B. $1 - x, -1 < x \leq -\frac{1}{4}$

C. $\frac{1}{2} + x, -\frac{1}{4} < x < 0$

D. $1 + x, 0 \leq x < 1$

Answer: A::B::C::D

Watch Video Solution

3. Let f(x) be defined on [-2,2] and is given by

$$f(x) = \begin{cases} -1 & -2 \leq x \leq 0 \\ x - 1 & 0 < x \leq 2 \end{cases}$$

and g(x) $= f(|x|) + |f(x)|$. Then g(x) is equal to

A. $-x, \ -2 \leq x \leq 0$

B. $x, \ -2 \leq x \leq 0$

C. $0, 0 < x \leq 1$

D. $2(x - 1), 1 < x \leq 2$

Answer: A::C::D

Watch Video Solution

Exercise Statement I And Ii Type Questions

1. Statement I The graph of $y = \sec^2 x$ is symmetrical about the Y-axis.

Statement II The graph of $y = tax$ is symmetrical about the origin.

A. Both Statement I and Statement II are correct and Statement II is the correct explanation of Statement I

B. Both Statement I and Statement II are correct but Statement II is not the correct explanation of

Statement I

C. Statement I is correct but Statement II is incorrect

D. Statement II is correct but Statement I is incorrect

Answer: A

Watch Video Solution

2. Statement I The equation $|(x-2)+a|=4$ can have four distinct real solutions for x if a belongs to the interval $(-\infty, 4)$.

Statemment II The number of point of intersection of the curve represent the solution of the equation.

A. Both Statement I and Statement II are correct and Statement II is the correct explanation of Statement I

B. Both Statement I and Statement II are correct but Statement II is not the correct explanation of Statement I

C. Statement I is correct but Statement II is incorrect

D. Statement II is correct but Statement I is incorrect

Answer: D

Watch Video Solution

Exercise Passage Based Questions

1. Let $f(x) = f_1(x) - 2f_2(x)$, where

$$f_1(x) = \begin{cases} \min\{x^2, |x|\}, & |x| \leq 1 \\ \max\{x^2, |x|\}, & |x| > 1 \end{cases}$$

and $$f_2(x) = \begin{cases} \min\{x^2, |x|\}, & |x| > 1 \\ \max\{x^2, |x|\}, & |x| \leq 1 \end{cases}$$

and let $$g(x) = \begin{cases} \min\{f(t), -3 \leq t \leq x, -3 \leq x < 0\} \\ \max\{f(t), 0 \leq t < x, 0 \leq x \leq 3\} \end{cases}$$

For $x \in (-1, 00)$, $f(x) + g(x)$is

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

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

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

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

Answer: b

Watch Video Solution

2. Let $f(x) = f_1(x) - 2f_2(x)$, where

$$f_1(x) = \begin{cases} \min\{x^2, |x|\}, & |x| \le 1 \\ \max\{x^2, |x|\}, & |x| > 1 \end{cases}$$

and $$f_2(x) = \begin{cases} \min\{x^2, |x|\}, & |x| > 1 \\ \max\{x^2, |x|\}, & |x| \le 1 \end{cases}$$

and let $$g(x) = \begin{cases} \min\{f(t),\ -3 \le t \le x,\ -3 \le x < 0\} \\ \max\{f(t), 0 \le t < x, 0 \le x \le 3\} \end{cases}$$

The graph of $y = g(x)$ in its domain is broken at

A. 1 point

B. 2 points

C. 3 points

D. None of these

Answer: A

Watch Video Solution

3. Consider the function $f(x) = f(x) = \begin{cases} x-1, & -1 \leq x \leq 0 \\ x^2, & 0 \leq x \leq 1 \end{cases}$

and $g(x) = \sin x.$

If $h_1(x) = f(|g(x)|)$

and $h_2(x) = |f(g(x))|.$

Which of the following is not true about $h_1(x)$?

A. It is a periodic function with period π

B. The range is [0, 1]

C. Domain R

D. None of these

Answer: D

View Text Solution

4. Consider the function

$$f(x) = f(x) = \begin{cases} x - 1, & -1 \leq x \leq 0 \\ x^2, & 0 \leq x \leq 1 \end{cases}$$

and $g(x) = \sin x.$

If $h_1(x) = f(|g(x)|)$

and $h_2(x) = |f(g(x))|.$

Which of the following is not true about $h_2(x)$?

A. The domain is R

B. It is periodic with period 2π

C.

D. The range is [0, 1]

Answer: B

View Text Solution

Exercise Subjective Type Questions

1. Let $f(x) = x + 2|x + 1| + x - 1 \mid \dot{I} f f(x) = k$ has exactly one real solution, then the value of k is 3 (b) 0 (c) 1 (d) 2

Watch Video Solution

2. The number of roots of the equation $x \sin x = 1, , x \in [-2\pi, 0] \cup (0, 2\pi)$ is

Watch Video Solution

3. The number of solutions of $\tan x - mx = 0, m > 1,$ in $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ is 1 (b) 2 (c) 3 (d) m

Watch Video Solution

Exercise Questions Asked In Previous 13 Years Exam

1. Find the number of solutions of the equation $\frac{x^2}{1-|x-2|}=1$, graphically.

Watch Video Solution

2. Find the number of solutions for $\tan 4x = \cos x$, when $x \in (0, \pi)$

Watch Video Solution

3. Find number of solutions for equation $\left[\sin^{-1} x\right] = x - [x]$, where $[.]$ denotes the greatest integer function.

Watch Video Solution

4. If x and y satisfy the equations $\max(|x+y|, |x-y|) = 1$ and $|y| = x - [x]$, the number of ordered paris (x, y).

Watch Video Solution

5. Find the area enclosed by $|x+y-1| + |2x+y+1| = 1$.

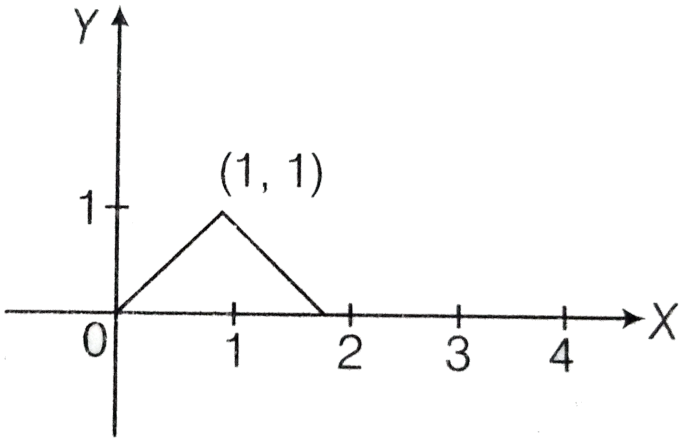
Watch Video Solution

6. Find f(x) when it is given by

$$f(x) = \max\left\{x^3, x^2, \frac{1}{64}\right\}, \forall x \in [0, \infty).$$

Watch Video Solution

7. Find a formula for the function f graphed as



Watch Video Solution

8. Find the domain for $f(x) = \frac{1}{[|x-1|] + [|5-x|] - 4}$ graphically.

Watch Video Solution

9. Draw the graph for $y = \sqrt{\{x\}}$ and $|y| = \sqrt{\{x\}}$.

Watch Video Solution

10. Draw the graph for $y = -[x] + \sqrt{\{x\}}$.

Watch Video Solution