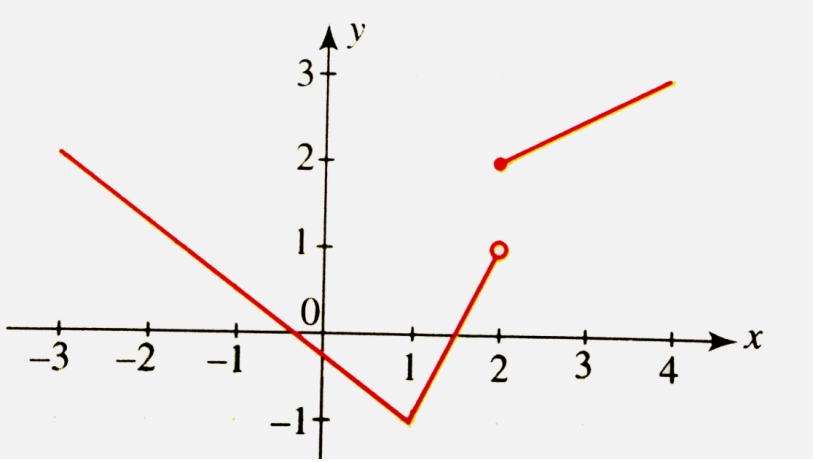
MATHS

BOOKS - CENGAGE MATHS (HINGLISH)

GETTING STARTED WITH GRAPHS

Illustrations

1. Does the following graph represent a function or a relation?



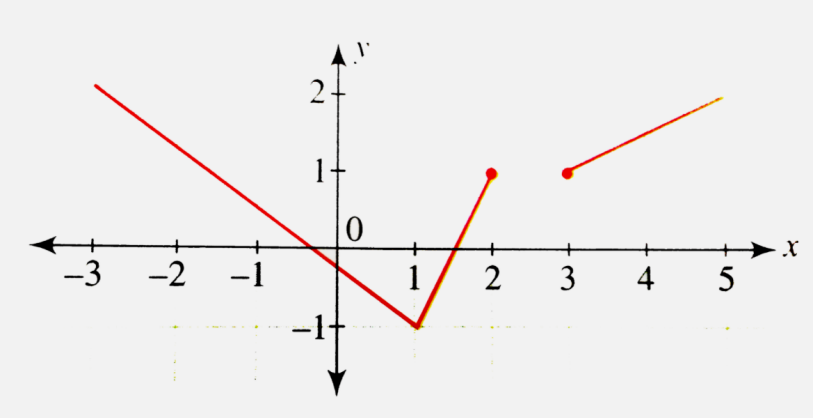
View Text Solution

2. Does the graph below represent a function or a relation?

`(##CEN_GRA_C01_S01_002_Q01.png" width="80%">

View Text Solution

3. Does the following graph pass the vertical or horizontal line test?



View Text Solution

4. In how many points graph of $y = x^3 - 3x2 + 5x - 3$ interest the x-axis?

Watch Video Solution

5. Following is the graph of y = f(x).

$(\#\#CEN_GRA_C01_S01_{005}\_Q01.png \quad \text{width}=80\,\% > F \in dthe\sqrt[s]{o}ftheeqn$

f(x) = 0, f(x) = 4 and f(x) = 10`.

View Text Solution

6. Which of the following pairs of graphs intersect?

(i) $y = x^2 - x \text{ and } y = 1$

(ii) $y = x^2 - 2x + 3 \text{ and } y = \sin x$

(iii) $y = x^2 - x + 1 \text{ and } y = x - 4$

View Text Solution

7. The graph of y = f(x) is shown, find the number of solution of f(f(x)) = 2.

`(##CEN_GRA_C01_S01_007_Q01.png" width="80%">

View Text Solution

8. Does the fraph of the function $f(x) = x^2 - 3$ have y - axis symmetry?

Watch Video Solution

9. Does the graph of the function $f(x) = 1/x^3$ have origin symmetry?

Watch Video Solution

10. Which of the following functions has (have) y-symmetry or origin symmetry?

(i) $f(x) = x^2 \sin x$

$(ii) f(x) = \log\left(x + \sqrt{1 + x^2}\right)$

(iii)

$f(x) = \dfrac{e^x + e^{-x}}{2}$

$(iv) f(x) = \begin{cases} 0, & \text{If x is rational} \\ 1, & \text{If x is irrational} \end{cases}$

Watch Video Solution

11. Let $f: R \to R$ be a continuous onto function satisfying $f(x) + f(-x) = 0, \forall x \in R$. If $f(-3) = 2$ and $f(5) = 4$ in [-5, 5], then what is the minimum number of roots of the equation f(x) = 0?

View Text Solution

12. Let $f: R \to R$ and $g: R \to R$ be two one-one and onto functions such that they are mirror images of each other about the line $y = a$. If $h(x) = f(x) + g(x)$, then $h(x)$ is (A) one-one onto (B) one-one into (D) many-one into (C) many-one onto

Watch Video Solution

13. Check weather the following function/functions is/are periodic or not? Find the period in case the function is periodic.

`(##CEN_GRA_C01_S01_013_Q01.png" width="80%">

View Text Solution

14. Draw the graph of $f(x) = \begin{cases} (x - 2n, & 2n \leq x < 2n + 1), (\end{cases}$

periodic? If yes, what is its period?

Watch Video Solution

15. The graph of $y = f(x)$ is as shown in the following figure.

Find the following values:

(i) $\lim_{x \to 4} f(x)$ (ii) $\lim_{x \to -3} f(x)$

(iii) $\lim_{x \to 0^+} f(x)$ (iv) $f(x)_{x \to 0^-}$

(v) $\lim_{x \to 0} f(x)$ $(vi) f(-2)$

(vii) $\lim_{x \to 2^-} f(x)$ $(viii)$ $\lim_{x \to -2^-} f(x)$

(ix) $\lim_{x \to 0} f(x+1)$ $(x) f(0)$

(xi) $\lim_{x \to 0^+} f(x-2)$ (xii) $\lim_{x \to 1^-} f(x-4)$

View Text Solution

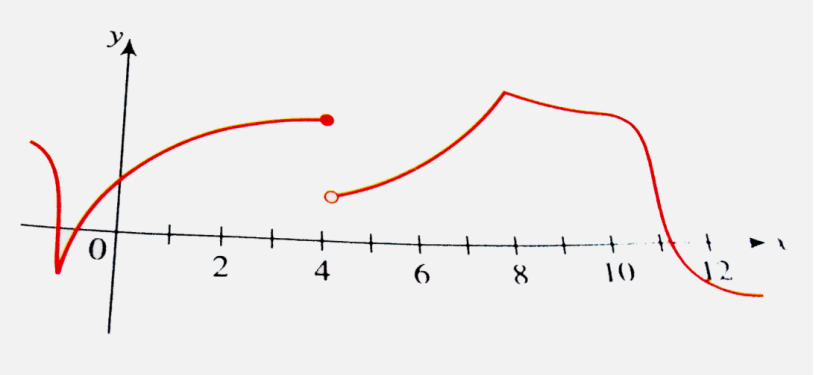
16. The graph of $y = f(x)$ is as shown in the following figure.

`(##CEN_GRA_C01_S01_016_Q01.png" width="80%">

Identify the points of discontinuity and give the reason for the same.

View Text Solution

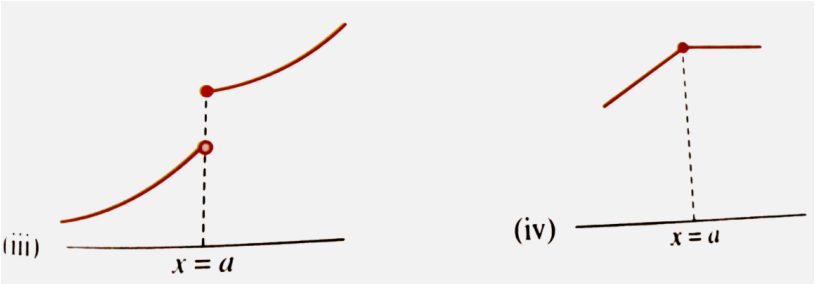
17. The graph of f(x) is given. State with reasons the number at which the function is non-differentiable.



View Text Solution

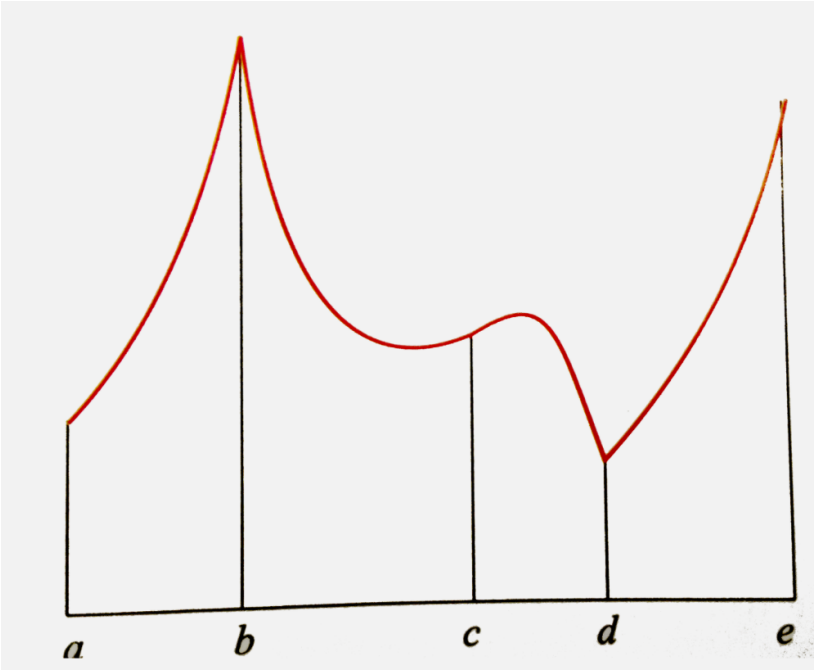
18. For each of the following graphs, comment whether f(x) is increasing or decreasing or neither increasing nor decreasing at x = a.

` (##CEN_GRA_C01_S01_018_Q01.png" width="80%">



View Text Solution

19. The graph of a function is shown in the following figure.



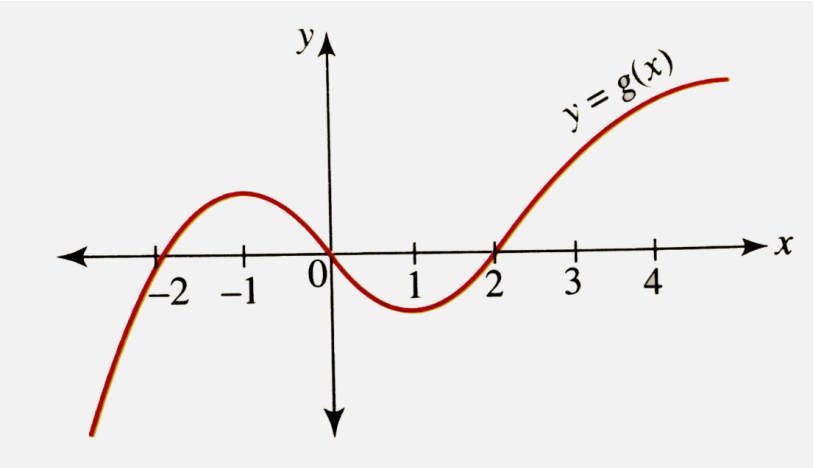
Determine the intervals on which the function is concave up and the

intervals on which it is concave down. Find the x - coordinates of any inflection points.

View Text Solution

20. For the function g whose graph is given. Arrange the following numbers in increasing order and explain your reasoning.

$g(0), g'(-2), g'(0), g'(2), g'(4)$



View Text Solution

21. The diagram shows the graph of the derivative of a functin f(x) for $0 \leq x \leq 4$ with f(0) = 0. Which of the following could be correct statements for y = f(x)?

$(\#\#CEN_GRA_C01_S01_{021} \_ Q01.\, png \quad \text{width=80 \%} \ > (a)\tan \geq ntl \in e \rightarrow$

sec^(-1) sqrt 5` with the x - axis.

(b) f is increasing in (0, 3).

(c) x = 1 is both an inflection point and the point of local extremum.

(d) Number of critical point on y = f(x) is two.

View Text Solution

22. In the following graph, state the absolute and local maximum and minimum values of the function.

`(##CEN_GRA_C01_S01_022_Q01.png" width="80%">

View Text Solution

23. The graph of the derivative f'(x) is given in the following figure.

(b) Find the values of x for which f has local maximum or minimum.

(c) Find the intervals in which f is concave upward or downward.

(d) Find the point of inflection.

`(##CEN_GRA_C01_S01_023_Q01.png" width="80%">

View Text Solution

24. The graph of the second derivation f''(x) is given in the following figure. State the x - coordinate of the point of inflection of f. Given reasons for your answer.

`(##CEN_GRA_C01_S01_024_Q01.png" width="80%">

View Text Solution

25. The figure shows the graphs of f, f' and f'' . Identify each curve and explain your choices.

`(##CEN_GRA_C01_S01_025_Q01.png" width="80%">

View Text Solution

26. Following is the graph of y = f' (x) , given that f(c) = 0. Analyse the graph and answer the following questions.

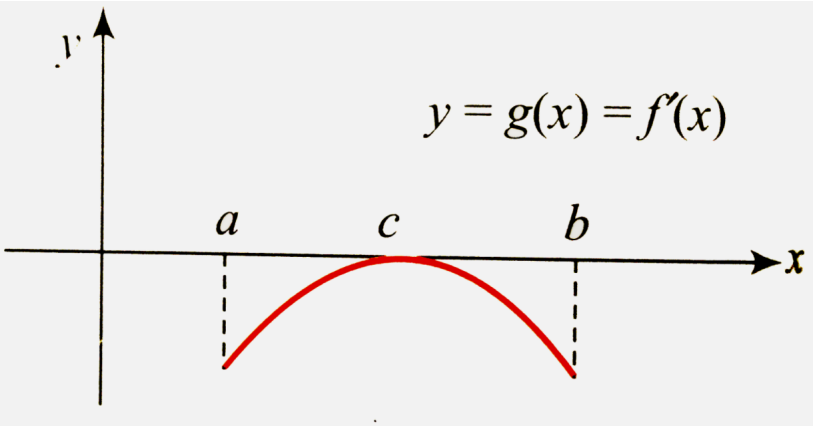
(a) How many times the graph of y = f(x) will intersect the x - axis?

(b) Discuss the type of roots of the equation f (x) = 0, $a \leq x \leq b$.

(c) How many points of inflection the graph of $y = f(x), a \leq x \leq b$, has?

(d) Find the points of local maxima/minima of$y = f(x), a < xb$.

(e) How many roots equation $f''(x) = 0$ has?



View Text Solution

27. Find the asymptote of the function $y = \dfrac{2x^2 + 3x + 1}{x}$ if any.

Watch Video Solution

28. Find the horizontal, vertical and oblique asymptotes of each of the curves.

$(a)\quad y = \dfrac{x}{x+4}$ $(b)\quad y = \dfrac{x^2+4}{x^2-1}$

$(c)\quad y = \dfrac{x^3}{x^2+3x-10}$ $(d)\quad y = \dfrac{x^3+1}{x^3+x}$

$(e)\quad y = \dfrac{x}{\sqrt[4]{x^4+1}}$ $(f)\quad y = \dfrac{x-9}{\sqrt{4x^2+3x+2}}$

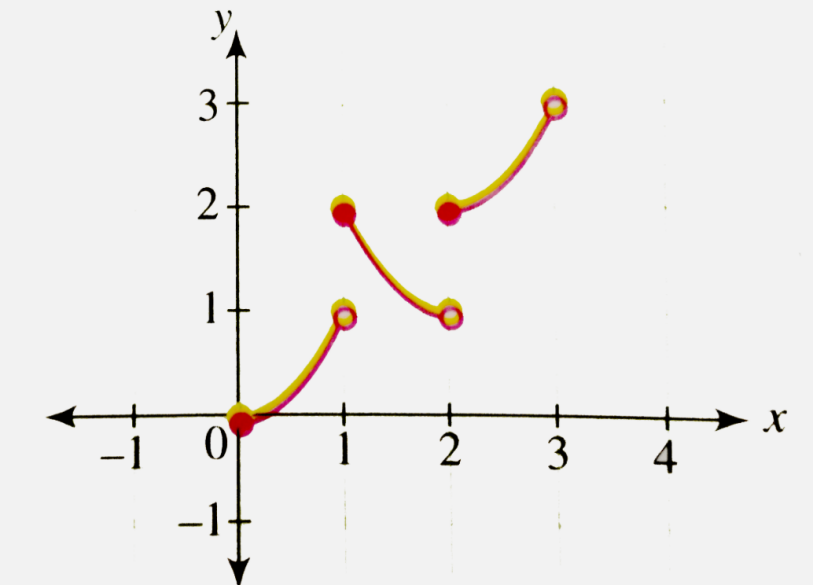
$(g)\quad y = \dfrac{1}{2^x-1}$ $(h)\quad y = \dfrac{1}{\log_e x}$

$(i)\quad y = \dfrac{1}{2^x-1}$

View Text Solution

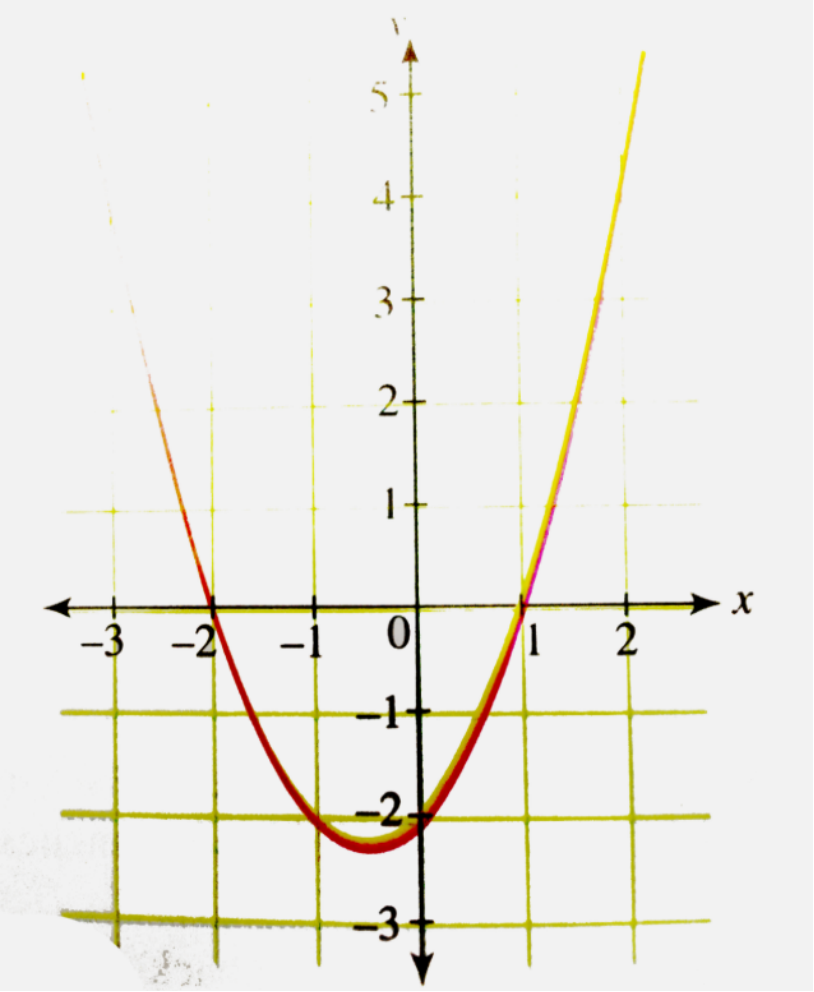
Exercise

1. Does the following graph pass the vertical or horizontal line test ?



View Text Solution

2. Consider the graph of y = f(x) as shown in the following figure.



(i) Find the sum of the roots of the equation f (x) = 0.

(ii) Find the product of the roots of the equation f(x) = 4.

(iii) Find the absolute value of the difference of the roots of the equation f(x) = x+2 .

View Text Solution

View Text Solution

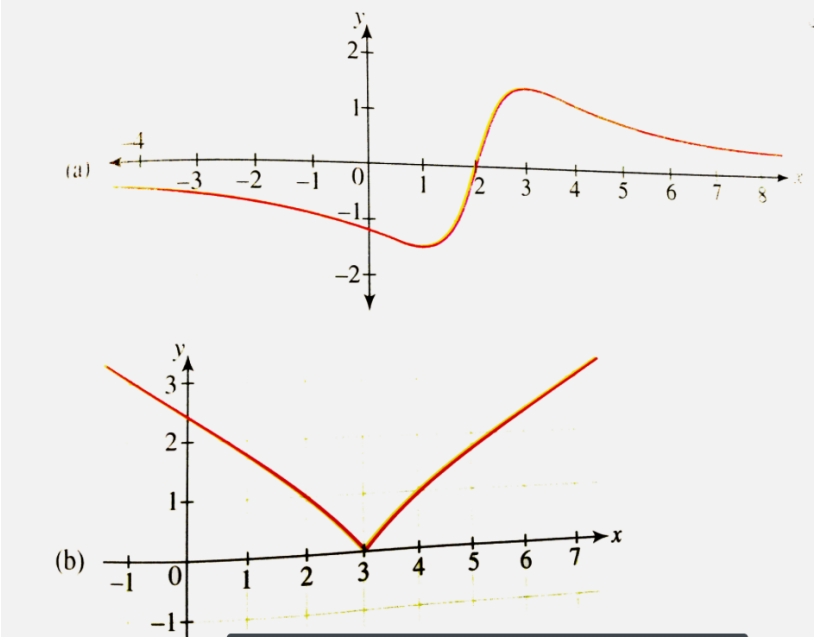
3. Which of the following functions has (have) y-symmetry or origin symmetry?

(i) $f(x) = x^2 \sin x$ $(ii) f(x) = \log\left(\frac{1-x}{1+x}\right)$

(iii) $f(x) = \frac{x}{e^x - 1} + \frac{x}{2} + 1$

Watch Video Solution

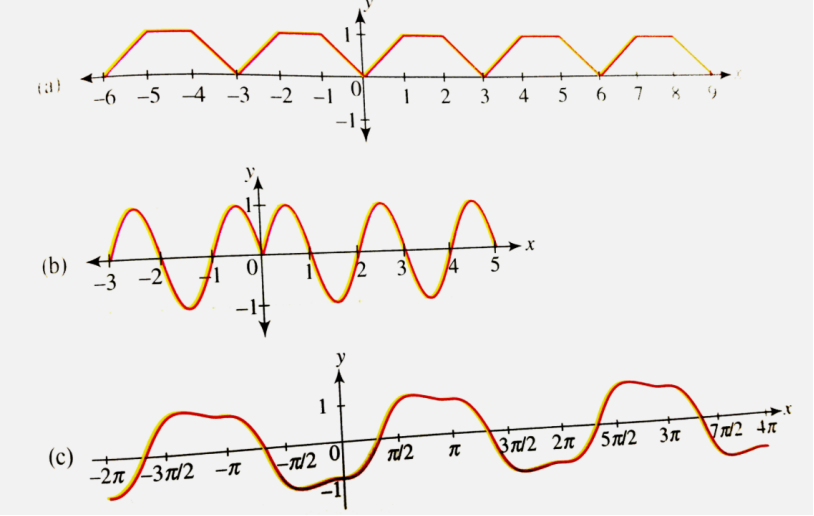
4. The graph of functions are given in the following fingure. Discuss the symmetry.



View Text Solution

5. Check weather the following function/functions is/are periodic or not?

Find the period in case the function is periodic.

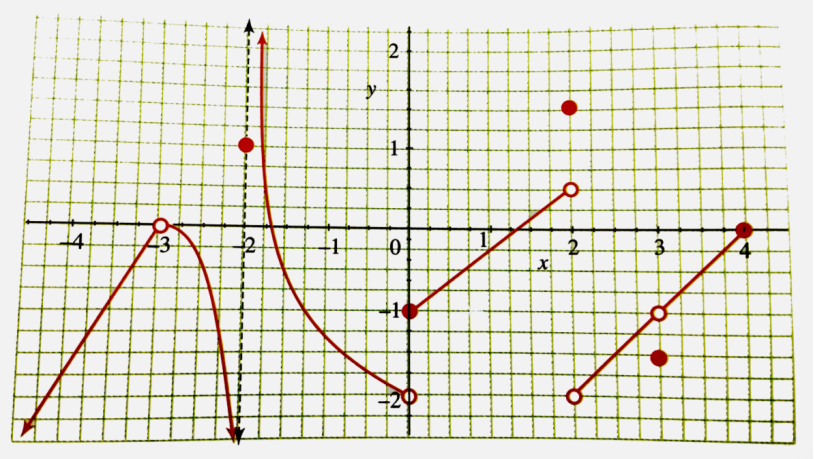


View Text Solution

6. Suppose that f is even, periodic function with period 2, and that f(x) = x for all x in the interval [0, 1]. Then draw the graph of y = f(x).

Watch Video Solution

7. The graph of y = f(x) is as shown in the following figure.



Find the following values

(i) $f(-3)$ $(ii)\, f(-2)$ $(iii)\, f(0)$

(iv) $f(2)$ $(v)\, f(3)$ $(vi)\ \lim_{x \to -3} f(x)$

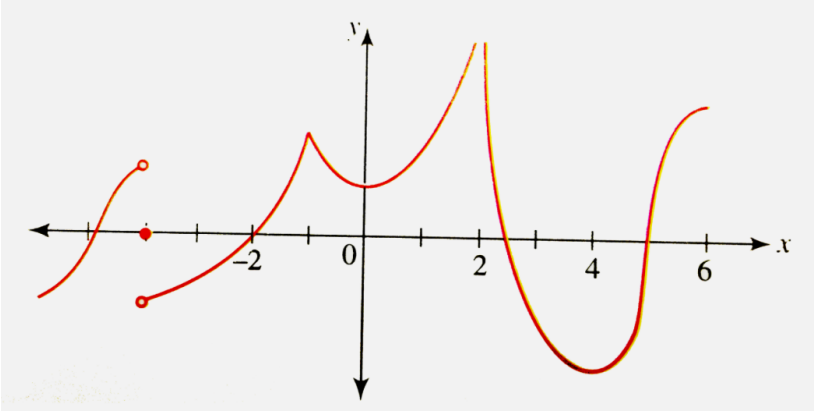
(vii) $\lim_{x \to 0} f(x)$ $(viii)\ \lim_{x \to 2} f(x)$ $(ix)\ \lim_{x \to 3} f(x)$

$(x)\ \lim_{x \to 2^-} f(x)$ $(\xi)\ \lim_{x \to -2^+} f(x)$ $(xii)\ \lim_{x \to 0^-} f(x)$

(x iii) $\lim_{x \to 0^+} f(x)$

View Text Solution

8. The graph of f is shown. State, with reason, the numbers at which f is not differentiable.



View Text Solution

9. The graph of f is given.

State the equations of all the asymptotes.

View Text Solution

10. (a) Can the graph of the function intersect the horizontal asymptote?

(b) Can the graph of the function intersect the vertical asymptote?

Watch Video Solution

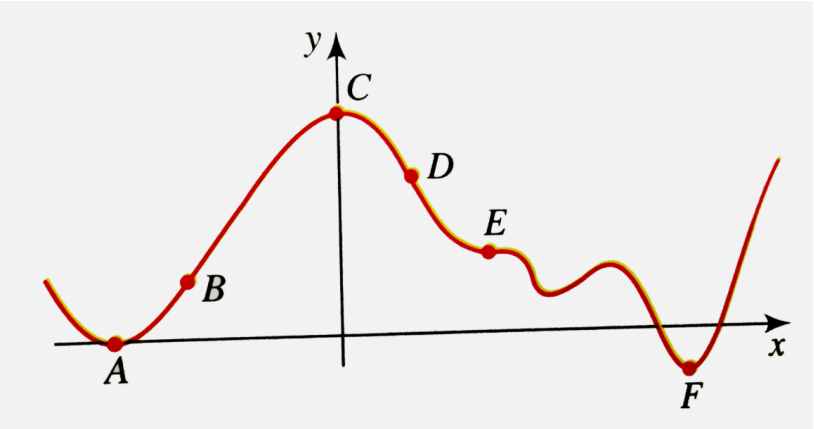
11. The graph of y = f(x) is given with six labelled points. Anser the following questions.

(a) At which point f'(x) has the greatest value?

(b) At which point f(x) and f'(x) both are zero?

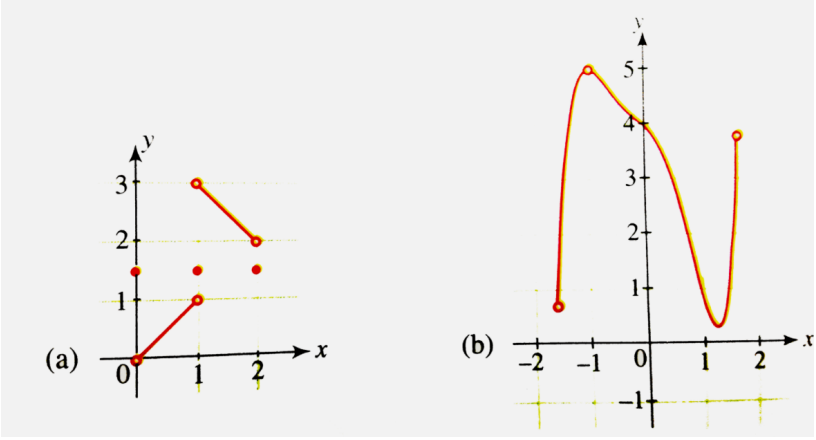
(c) At how many point f'(x) is negative ?

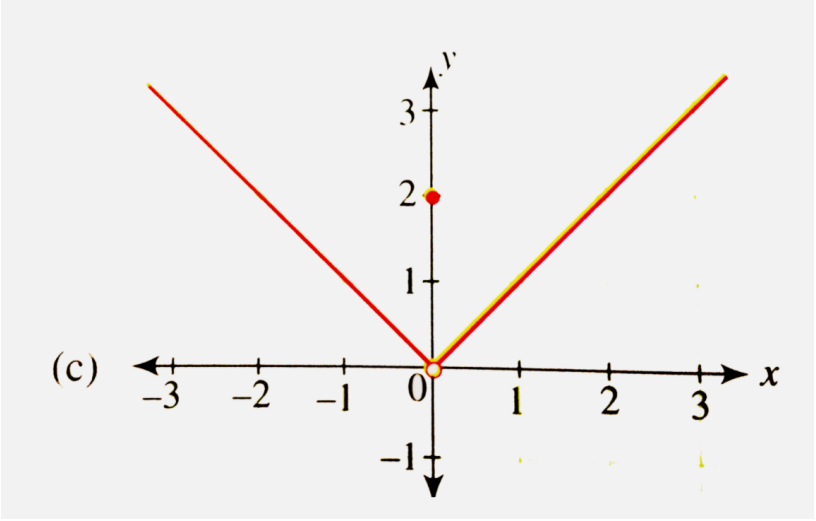
(d) Which is the point of infection?



View Text Solution

12. Graph of functions are given in the following figure. Check the functions for absolute extremum.





View Text Solution

13. In the following graph, state the absolute and the local maximum and minimum values of the function.

View Text Solution

14. The graph of the derivative f'(x) is given in the following figure.

(a) Find the interval in which f is increasing or decreasing.

(b) Find the values of x for which f has local maximum or minimum.

(c) Find the intervals in which f is concave upward or downward.

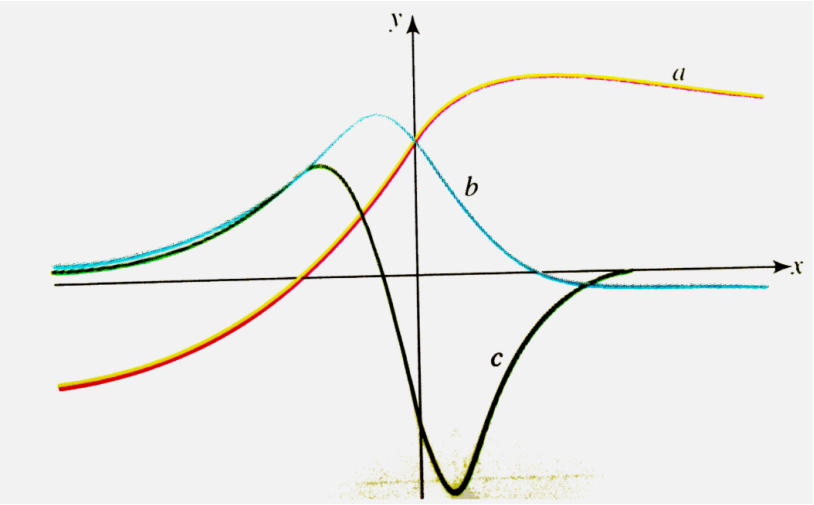
(c) Find the point of inflection.

View Text Solution

15. The graph of y = f' (x) is shown. Find the point of local maxima, local minima and the point of inflection of f(x).

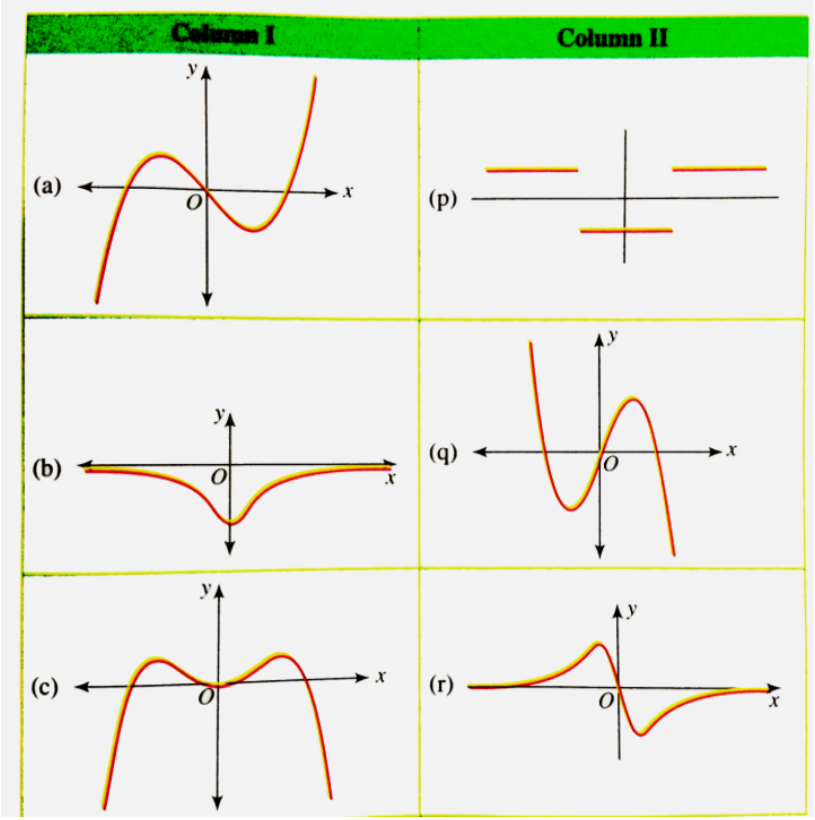
View Text Solution

16. The figure shows the graphs of f, f' and f''. Indentify each curve and explain your choices.



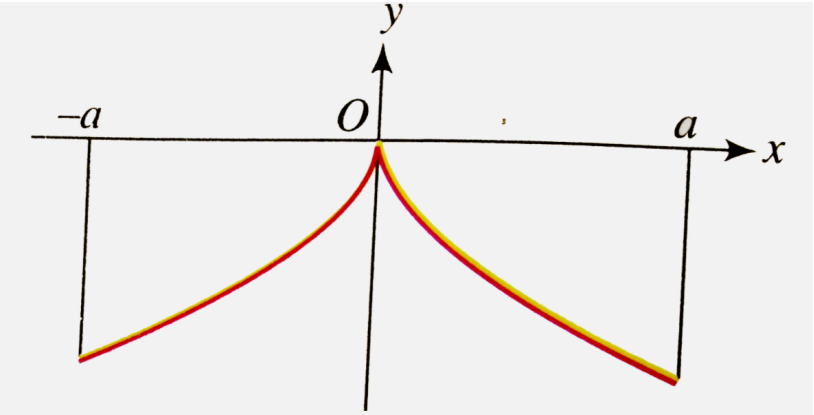
View Text Solution

17. Match the graph of y = f(x) in Column I with the corresponding graph of y = f'(x) in Column II.



View Text Solution

18. Following is the graph of y = f'(x) and f(0) = 0 .



(a) What type of function y = f'(x) is ? Odd or even?

(b) What type of function y = f(x) is ? Odd or even?

(c) What is the value of $\int_{-a}^{a} f(x)dx$?

(d) Has y = f(x) point of inflection?

(e) What is the nature of y = f(x)? Monotonic or non-monotonic?

View Text Solution