



Q1) Choose the correct answer

1. Let $f(x) = x^3 - 3x^2 + 2$.

At which x-value does a local maximum occur?

- a. $x = 0$
- b. $x = 1$
- c. $x = 2$
- d. No local maximum

2. Let $f(x) = x^2 - 4x + 5$.

What type of extremum does the function have?

- a. Local maximum
- b. Local minimum
- c. Both
- d. None

3. Let $f(x) = x^3 - 6x^2 + 9x$.

How many critical points does the function have?

- a. 0
- b. 1
- c. 2
- d. 3

4. Let $f(x) = x^4$.

What happens at $x = 0$?

- a. Local maximum
- b. Local minimum
- c. Inflection point
- d. No extremum

5. Let $f(x) = x^3$.

What happens at $x = 0$?

- a. Local maximum
- b. Local minimum
- c. Inflection point
- d. Absolute maximum

6. Let $f(x) = -2x^2 + 8x$.

What is the x-value of the maximum point?

- a. $x = 2$
- b. $x = 4$
- c. $x = -2$
- d. $x = 0$

7. Let $f(x) = x^4 - 4x^2$.

How many local minima does the function have?

- a. 0
- b. 1
- c. 2
- d. 3

8. Find the absolute maximum of

$f(x) = -x^2 + 4x$ on $[0, 4]$.

- a. 0
- b. 4
- c. 8
- d. 16

9. Let $f(x) = x^3 + 3x$.

How many relative extrema does the function have?

- a. 0
- b. 1
- c. 2
- d. 3

10. Let $f(x) = x^2 + 1$.

What is the absolute minimum value?

- a. 0
- b. 1
- c. 2
- d. Does not exist

11. Let $f(x) = \sin x$ on $[0, 2\pi]$.

What is the absolute maximum value?

- a. 0
- b. 1
- c. π
- d. 2

12. A rectangle has a fixed perimeter. Its area is modeled by a function $A(x)$. When is the maximum area achieved?

- a. When length > width
- b. When width > length
- c. When length = width
- d. When perimeter increases

13. Let $f(x) = x^3 - 3x$.

At which x-value(s) does the function have local extrema?

- a. $x = -1$ only
- b. $x = 1$ only
- c. $x = -1, 1$
- d. No extrema

14. Let $f(x) = x^4 - 2x^2 + 1$.

What is the minimum value of the function?

- a. 0
- b. 1
- c. -1
- d. Does not exist

15. Let $f(x) = \cos x$ on $[0, 2\pi]$.

At which x-value does the absolute minimum occur?

- a. $x = 0$
- b. $x = \pi$
- c. $x = 2\pi$
- d. $x = \frac{\pi}{2}$