



Q.1 If $f(x, y)$ is continuous on a closed and bounded set R , then f has _____ on R .

- A. (c) relative minimum
- B. (b) absolute minimum
- C. (a) absolute maximum
- D. (d) both (a) and (b).

Q.2 The line segment between the points $(-1, 2)$ and $(3, 6)$ with slope 2 has the equation

- A. $y = 3x - 2$
- B. $y = 2x + 4$
- C. $y = 2x - 2$
- D. $y = 3x + 2$

Q.3 If a continuous function on a closed and bounded interval has an absolute maximum at c then:

- A. $f(c) = f(a)$
- B. $f(c) > f(a)$
- C. $f(c) < f(a)$
- D. It is not possible to determine the relationship between $f(c)$ and $f(a)$

Q.4 Consider the function $f(x) = 1/x$ defined on the interval $[1, 3]$. Where is the minimum?

- A. It has an absolute minimum at $x = 3$
- B. It has an absolute minimum at $x = 1$
- C. It has an absolute minimum at $x = 2$
- D. It has an absolute minimum at $x = 3/2$

Q.5 If the lengths of the sides of a parallelepiped are $x=2$, $y=3$, and $z=4$, then what will be the volume of this parallelepiped?

- A. 5
- B. 12
- C. 24
- D. 48

Q.6 The absolute extrema of $f(x) = x^2 - 2$ on the interval $[-2, 2]$ are

- A. $(0, 2)$
- B. $(0, -1)$
- C. $(0, 0)$
- D. $(0, -2)$

Q.7 If $f''(x) > 0 \sim \forall x \in I$, then the graph of f is _____ on I .

- A. concave upward
- B. None of these
- C. constant
- D. concave downward

Q.8 Let $f(x, y)$ be a continuous function with $D = \{f_{xx}(x_0, y_0)f_{yy}(x_0, y_0) - {f_{xy}}^2(x_0, y_0) > 0\}$ and $f_{xx}(x_0, y_0) > 0$ then _____.

- A. f has a relative maximum at (x_0, y_0)
- B. No conclusion could be drawn about f
- C. f has a relative minimum at (x_0, y_0)
- D. f has a saddle point at (x_0, y_0)

Q.9 Let $f(x, y)$ be a function with continuous second order partial derivatives in some circle centered at a critical point (x_0, y_0) and let $D = f_{xx}(x_0, y_0)f_{yy}(x_0, y_0) - {f_{xy}}^2(x_0, y_0) > 0$ and $f_{xx}(x_0, y_0) > 0$ then _____.

- A. $f(x, y)$ has a relative maximum at (x_0, y_0) .
- B. $f(x, y)$ has a relative minimum at (x_0, y_0) .
- C. No conclusion can be drawn.
- D. $f(x, y)$ has a saddle point at (x_0, y_0) .

Q.10 If the graph of f lies below all of its tangents on an interval I , then it is called _____ on I .

- A. None of these
- B. constant function
- C. concave upward
- D. concave downward