

Q.1. The set is open if and only if its complement is

- A. Open
- B. Closed*
- C. Bounded
- D. Compact

Q.2. Subsets of \mathbb{R}^n that are both closed *and* bounded are called

- A. Compact sets
- B. Compressed sets
- C. Complex sets
- D. Complete sets

Q.3. Which of the following determinant is used to find the dependence for the following equations?

$$y_1 = 5x_1 + 3x_2$$

$$y_2 = 25x_1^2 + 30x_1x_2 + 9x_2^2$$

- A. Jacobian*
- B. Discriminant
- C. Hessian
- D. Bordered Hessian

Q.4. For the following demand function at equilibrium price 9, the consumer's surplus is

$$P_d = 25 - Q^2$$

- A. 42.67*
- B. 16
- C. 4
- D. 64

Q5. For the following optimization problem, the solution of $x(t)$ is

$$\int_0^2 (6x - 4y^2) dt$$

$$\dot{x} = 16y$$

$$x(0) = 24 \quad x(2) = 408$$

- A. $-6t + 12$

B. $-96t^2 + 384t + 24$ *

C. $-12t + 24$

D. None of these