

CLASS XI MATHS CBT QUESTIONS (SEPTEMBER)

CASE STUDY BASED QUESTIONS-

1. A conjugate of a complex number is another complex number that has the same real part as the original complex number, and the imaginary part has the same magnitude but opposite sign. If we multiply a complex number with its conjugate, we get a real number. A complex number z is purely real if and only if $z = \bar{z}$ and is purely imaginary if and only if $\bar{z} = -z$.

Based on the above information, answer the following questions-

(i) Find the conjugate of $(2+i)^2$

- (a) $1+4i$ (b) $1-4i$ (c) $3+4i$ (d) $3-4i$

Ans. $1-4i$

(ii) Find the multiplicative inverse of $4-3i$

- (a) $3+4i/25$ (b) $3-4i/25$ (c) $4+3i/25$ (d) $4-3i/25$

Ans. $4+3i/25$

(iii) Express $(3+4i)(6-3i)(5+i)$ in the form of $a+ib$

- (a) $124-125i$ (b) $125+124i$ (c) $135-105i$ (d) $135+105i$

Ans. $135+105i$

(iv) If $z = -3-6i$, then its conjugate is-

- (a) $-3+6i$ (b) $3+6i$ (c) $3-6i$ (d) $1/-3-6i$

Ans. $-3+6i$

2) Aditya's mother gave him Rs. 200 to buy some packets of rice and Maggie from the market. The cost of one packet of rice is Rs. 30 and that of one packet of Maggie is Rs. 20. Let x denote the number of packet of rice and y denote the number of packets of Maggie.

Based on the above information, answer the following questions-

(i) Find the inequality that represents the given situation.

- (a) $30x + 20y \leq 200$ (b) $30x - 20y \leq 200$ (c) $30x + 20y = 200$ (d) $30x + 20y \geq 200$

Ans. $30x + 20y \leq 200$

(ii) If he buys 4 packets of rice and spends entire amount of Rs. 200, then find the maximum number of packets of Maggie that he can buy using entire amount-

- (a) 3 (b) 4 (c) 2 (d) 5

Ans. 4

(iii) Solve the following inequality for real x : $4x + 3 < 5x + 7$

- (a) $x < -4$ (b) $x=4$ (c) $x > -4$ (d) $x > 4$

Ans. $x > -4$

(iv) If $a < b$ and $c < 0$ then

- (a) $a/c = b/c$ (b) $a/c > b/c$ (c) $a/c < b/c$ (d) None of these

Ans. $a/c > b/c$

ASSERTION AND REASONING QUESTIONS-

3. **Assertion (A):** : If $\sqrt{a+ib} = x + iy$ then $\sqrt{a-ib} = x-iy$

Reason (R): : A complex number z is said to be purely imaginary, if $\text{Re}(z) = 0$.

- (a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(C) A is true but R is false.
(d) A is false but R is true.
(e) Both A and R are false.

Ans. A is false but R is true.

4. **Assertion (A)** : If $-5 \leq 2x + 9 \leq 2$, then $x \in [-7, -3.5]$.

Reason (R): On solving we get $-7 \leq x \leq -7/2$

- (a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true but R is not the correct explanation of A.
(c) A is true but R is false.
(d) A is false but R is true.
(e) Both A and R are false.

Ans. Both A and R are true and R is the correct explanation of A.