

SECTION A

$20 \times 1 = 20$ marks

This section has 18 multiple-choice questions and 2 assertion–reason questions of 1 mark each. For questions 19 and 20, choose the correct option (A), (B), (C) or (D) given below each question.

1. The greatest number which divides both 25 and 44, leaving remainders 1 and 8 respectively, is:

- A 26
- B 12
- C 13
- D 1

2. If the zeroes of the polynomial $(k^2 + 25)x^2 + 13x + 10k$ are reciprocal of each other, then k equals:

- A 10
- B 25
- C 5
- D -5

3. Vihaan correctly solved a pair of linear equations in two variables and found their only point of intersection as $(4, -6)$. One of the lines was $x - y = 10$. Which of the following could have been the other line? I: $3x - 3y = 30$ II: $3x - 5y = 40$ III: $3x - 5y = 42$

- A III only
- B I only
- C I and III
- D II and III

THE WORKED ANSWERS TO THOSE 3 QUESTIONS

1. The greatest number which divides both 25 and 44, leaving remainders 1 and 8 respectively, is: [Real numbers]

Correct answer: B — 12

- If the number d leaves remainder 1 on dividing 25, then d divides $25 - 1 = 24$.
- Similarly d divides $44 - 8 = 36$.
- The greatest such d is $\text{HCF}(24, 36) = 12$ (and 12 is larger than both remainders).
- Why the other options are wrong:
 - A (26): The remainders must be subtracted, not added.
 - C (13): A slip in the HCF of 24 and 36.
 - D (1): That is $\text{HCF}(25, 44)$. Subtract the remainders first.

LOS: Number Systems

KEY TAKEAWAY

Subtract each remainder from its number first; the greatest divisor is the HCF of the results.

2. If the zeroes of the polynomial $(k^2 + 25)x^2 + 13x + 10k$ are reciprocal of each other, then k equals: [Polynomials]

Correct answer: C — 5

- For zeroes that are reciprocals of each other, their product is 1.
- Product of zeroes = $c/a = 10k/(k^2 + 25)$.
- So $10k = k^2 + 25$, i.e. $k^2 - 10k + 25 = 0$, i.e. $(k - 5)^2 = 0$.
- Hence $k = 5$.
- Why the other options are wrong:
 - A (10): That is the coefficient 10, not the root of the equation.
 - B (25): That is k^2 , not k .
 - D (-5): The product of the zeroes is $c/a = 1$ gives $(k - 5)^2 = 0$, so $k = 5$, not -5 .

LOS: Algebra

KEY TAKEAWAY

Reciprocal zeroes mean product of zeroes = 1, so $c = a$.

3. Vihaan correctly solved a pair of linear equations in two variables and found their only point of intersection as (4, -6). One of the lines was $x - y = 10$. Which of the following could have been the other line? I: $3x - 3y = 30$ II: $3x - 5y = 40$ III: $3x - 5y = 42$ [Linear equations]

Correct answer: A — III only

- The other line must pass through (4, -6) and must not be the same line as $x - y = 10$.
- I: it is $x - y = 10$ multiplied by 3, the same line, so there would be infinitely many solutions.
- II: the left side gives 42 at (4, -6) but the line says 40. The point is not on it.
- III: $3(4) + (-5)(-6) = 42$, so the point lies on it and the line is different. It works.
- So the answer is: III only.
- Why the other options are wrong:
 - B (I only): Check each line by substituting the point and by comparing it with $x - y = 10$.
 - C (I and III): Check each line by substituting the point and by comparing it with $x - y = 10$.
 - D (II and III): Check each line by substituting the point and by comparing it with $x - y = 10$.

LOS: Algebra

KEY TAKEAWAY

A pair with exactly one solution has different slopes and both lines pass through the common point.