

Course: SBI Clerk Mains

Subject: Quadratic Inequalities

Time: 12 Minutes

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Directions (1-5): निम्नलिखित प्रश्नों में दो समीकरण I और II दिए गए हैं। दोनों समीकरण हल करें और उत्तर दीजिए-

(a) यदि $p > q$

(b) यदि $p \geq q$

(c) यदि $p < q$

(d) यदि $p \leq q$

(e) यदि $p = q$ या कोई सम्बन्ध स्थापित नहीं किया जा सकता

Q1. I. $6p^2 + 5p + 1 = 0$

II. $20q^2 + 9q = -1$

L1Difficulty 3

QTagsQuadratic Inequalities

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Q2. I. $3p^2 + 17p + 10 = 0$

II. $10q^2 + 9q + 2 = 0$

L1Difficulty 3

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Q3. I. $p^2 + 24 = 10p$

II. $2q^2 + 18 = 12q$

L1Difficulty 3

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Q4. I. $5p + 2q = 96$

II. $3(7p + 5q) = 489$

L1Difficulty 3

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Q5. I. $\frac{15}{\sqrt{p}} - \frac{9}{\sqrt{p}} = p^{\frac{1}{2}}$

II. $q^{10} - (36)^5 = 0$

L1Difficulty 3

Directions (6-10): निम्नलिखित समीकरण को हल करें और उचित उत्तर चुनिए-

- (a) यदि $x > y$
- (b) यदि $x \geq y$
- (c) यदि $y > x$
- (d) यदि $y \geq x$
- (e) यदि $x = y$ या कोई सम्बन्ध स्थापित नहीं किया जा सकता

Q6. I. $7x^2 - 23x + 18 = 0$

II. $4y^2 - 9y + 5 = 0$

L1Difficulty 3

Q7. I. $10x^2 - 11x - 6 = 0$

II. $y^2 + 5y + 6 = 0$

L1Difficulty 3

Q8. I. $13x^2 - 29x + 16 = 0$

II. $6y^2 - 11y + 5 = 0$

L1Difficulty 3

Q9. I. $x = \sqrt{169}$

II. $(y - 1)^2 = 144$

L1Difficulty 3

Q10. I. $7x + 11y = 29$

II. $11x + 7y = 25$

L1Difficulty 3

Directions (11-15): निम्नलिखित प्रश्नों में दो समीकरण I और II दिए गए हैं। दोनों समीकरण हल करें और उत्तर दीजिए-

(a) यदि $x > y$

(b) यदि $x \geq y$

(c) यदि $x < y$

(d) यदि $x \leq y$

(e) यदि $x = y$ या x और y के मध्य कोई सम्बन्ध स्थापित नहीं किया जा सकता

Q11. I. $x^2 - 264 = 361$

II. $y^3 - 878 = 453$

L1Difficulty 3

QTagsQuadratic Inequalities

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Q12. I. $679x^2 - 168x^2 = 3066$

II. $\sqrt{144}y^3 - 9y^3 = 1536$

L1Difficulty 3

QTagsQuadratic Inequalities

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Q13. I. $x^2 - 11x + 24 = 0$

II. $2y^2 - 9y + 9 = 0$

L1Difficulty 3

QTagsQuadratic Inequalities

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Q14. I. $\frac{12}{\sqrt{x}} - \frac{23}{\sqrt{x}} = 5\sqrt{x}$

II. $\frac{\sqrt{y}}{12} - \frac{5\sqrt{y}}{12} = \frac{1}{\sqrt{y}}$

L1Difficulty 3

QTagsQuadratic Inequalities

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Q15. I. $x^3 - 468 = 1729$

II. $y^2 - 1733 + 1564 = 0$

L1Difficulty 3

QTagsQuadratic Inequalities

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Solutions

S1. Ans.(c)

Sol. $6p^2 + 5p + 1 = 0$

$$6p^2 + 3p + 2p + 1 = 0$$
$$3p(2p + 1) + 1(2p + 1) = 0$$

$$\Rightarrow p = \frac{-1}{3}, \frac{-1}{2}$$

$$20q^2 + 9q + 1 = 0$$

$$\Rightarrow 20q^2 + 5q + 4q + 1 = 0$$

$$5q(4q + 1) + 1(4q + 1) = 0$$

$$\Rightarrow q = \frac{-1}{5}, \frac{-1}{4}$$

$$\therefore p < q$$

S2. Ans.(c)

Sol. $3p^2 + 17p + 10 = 0$

$$3p^2 + 15p + 2p + 10 = 0$$

$$3p(p + 5) + 2(p + 5) = 0$$

$$\Rightarrow p = -5, \frac{-2}{3}$$

$$10q^2 + 9q + 2 = 0$$

$$\Rightarrow 10q^2 + 5q + 4q + 2 = 0$$

$$5q(2q + 1) + 2(2q + 1) = 0$$

$$\Rightarrow q = \frac{-2}{5}, \frac{-1}{2}$$

$$\therefore p < q$$

S3. Ans.(a)

Sol.

$$p^2 + 24 = 10p$$

$$\Rightarrow p^2 - 10p + 24 = 0$$

$$p^2 - 6p - 4p + 24 = 0$$

$$p(p - 6) - 4(p - 6) = 0$$

$$\therefore p = 6, 4$$

$$\Rightarrow 2q^2 - 12q + 18 = 0$$

$$2q^2 + 18 = 12q$$

$$2q^2 - 6q - 6q + 18 = 0$$

$$\Rightarrow 2q(q - 3) - 6(q - 3) = 0$$

$$\Rightarrow q = 3, 3$$

$$\therefore p > q$$

S4. Ans.(a)

Sol. $5p + 2q = 96 \dots(\times 5)$

$$7p + 5q = \frac{489}{3} = 163 \dots(\times 2)$$

$$\Rightarrow 25p + 10q = 480 \dots(i)$$

$$14p + 10q = 326 \dots(ii)$$

Subtract (ii) from (i)

$$11p = 480 - 326$$

$$\Rightarrow p = \frac{154}{11} = 14$$

Now, $5p + 2q = 96$

$$2q = 96 - 5 \times 14$$

$$q = \frac{96 - 70}{2} = 13$$

$$\therefore p > q$$

S5. Ans.(b)

Sol.

$$\frac{15}{\sqrt{p}} - \frac{9}{\sqrt{p}} = p^{\frac{1}{2}}$$

$$\Rightarrow 6 = \sqrt{p} \times \sqrt{p}$$

$$p = 6$$

$$q^{10} - (36)^5 = 0$$

$$q^{10} = (6^2)^5$$

$$\Rightarrow q = \pm 6$$

$$\therefore p \geq q$$

S6. Ans.(a)

Sol.

$$\text{I. } 7x^2 - 23x + 18 = 0$$

$$7x^2 - 14x - 9x + 8 = 0$$

$$(7x - 9)(x - 2) = 0$$

$$x = \frac{9}{7}, 2$$

$$\text{II. } 4y^2 - 9y + 5 = 0$$

$$4y^2 - 4y - 5y + 5 = 0$$

$$4y(y - 1) - 5(y - 1) = 0$$

$$(4y - 5)(y - 1) = 0$$

$$y = \frac{5}{4}, 1$$

$$\Rightarrow x > y$$

S7. Ans.(a)

Sol.

$$\text{I. } 10x^2 - 11x - 6 = 0$$

$$5x(2x - 3) + 2(2x - 3) = 0$$

$$(5x + 2)(2x - 3) = 0$$

$$x = -\frac{2}{5}, \frac{3}{2}$$

$$\text{II. } y^2 + 5y + 6 = 0$$

$$y^2 + 2y + 3y + 6 = 0$$

$$y(y + 2) + 3(y + 2) = 0$$

$$(y + 3)(y + 2) = 0$$

$$y = -2, -3$$

$$\Rightarrow x > y$$

S8. Ans.(b)

Sol.

$$\text{I. } 13x^2 - 29x + 16 = 0$$

$$13x^2 - 13x - 16x + 16 = 0$$

$$13x(x-1) - 16(x-1) = 0$$

$$(13x-16)(x-1) = 0$$

$$x = \frac{16}{13}, 1$$

$$\text{II. } 6y^2 - 11y + 5 = 0$$

$$6y^2 - 6y - 5y + 5 = 0$$

$$6y(y-1) - 5(y-1) = 0$$

$$(6y-5)(y-1) = 0$$

$$y = \frac{5}{6}, 1$$

$$\Rightarrow x \geq y$$

S9. Ans.(b)

Sol.

$$\text{I. } x = \sqrt{169} = 13$$

$$\text{II. } (y-1)^2 = 144$$

$$y-1 = 12 \quad \text{or} \quad y-1 = -12$$

$$y = 13 \quad \text{or} \quad y = -11$$

$$\Rightarrow x \geq y$$

S10. Ans.(c)

Sol.

Adding I & II

$$18x + 18y = 54 \quad \Rightarrow x + y = 3 \dots(\text{iii})$$

Subtracting II from I

$$-4x + 4y = 4 \Rightarrow -x + y = 1 \dots(\text{iv})$$

Solving (iii) & (iv)

$$y = 2$$

$$x = 1$$

$$\Rightarrow y > x$$

S11. Ans.(e)

Sol.

$$\begin{array}{l|l} \text{I. } x^2 - 264 = 361 & \text{II. } y^3 - 878 = 453 \\ \text{or, } x^2 = 361 + 264 & \text{or, } y^3 = 453 + 878 \\ \therefore x^2 = 625 & \text{or, } y^3 = 1331 \\ \therefore x = \sqrt{625} = \pm 25 & \therefore y = \sqrt[3]{1331} = 11 \end{array}$$

Hence no relation can be established.

S12. Ans.(c)

Sol.

$$\begin{array}{l|l} \text{I. } 679x^2 - 168x^2 = 3066 & \text{II. } \sqrt{144}y^3 - 9y^3 = 1536 \\ 511x^2 = 3066 & 12y^3 - 9y^3 = 1536 \\ x^2 = 6 & 3y^3 = 1536 \\ x = \pm\sqrt{6} & y = 8 \end{array}$$

$$y > x$$

S13. Ans.(b)

Sol.

$$\text{I. } x^2 - 11x + 24 = 0$$

$$\Rightarrow x^2 - 8x - 3x + 24 = 0$$

$$\Rightarrow x(x - 8) - 3(x - 8) = 0$$

$$\Rightarrow (x - 3)(x - 8) = 0$$

$$\therefore x = 3 \text{ or } 8$$

$$\text{II. } 2y^2 - 9y + 9 = 0$$

$$\Rightarrow 2y^2 - 3y - 6y + 9 = 0$$

$$\Rightarrow y(2y - 3) - 3(2y - 3) = 0$$

$$\Rightarrow (2y - 3)(y - 3) = 0$$

$$\therefore y = \frac{3}{2} \text{ or } 3$$

Clearly $x \geq y$

S14. Ans.(a)

Sol.

$$\text{I. } 12 - 23 = 5\sqrt{x} \times \sqrt{x}$$

$$\Rightarrow -11 = 5x$$

$$\Rightarrow x = \frac{-11}{5}$$

$$\text{II. } \frac{\sqrt{y} - 5\sqrt{y}}{12} = \frac{1}{\sqrt{y}}$$

$$\Rightarrow -4\sqrt{y} \times \sqrt{y} = 12$$

$$\Rightarrow -4y = 12$$

$$\Rightarrow y = -3$$

$$x > y$$

S15. Ans.(b)

Sol.

$$\text{I. } x^3 = 1729 + 468 = 2197$$

$$\therefore x = \sqrt[3]{2197} = 13$$

$$\text{II. } y^2 = 1733 - 1564 = 169$$

$$\therefore y = \sqrt{169} = \pm 13$$

$$x \geq y$$

