



The Career Signature

QUANTITATIVE APTITUDE

Handouts



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QUADRATIC INEQUALITY

Directions : Two equations (I) and (II) are given in each question. On the basis of these equations you have to decide the relation between 'x' and 'y' and give answer.

(a) if $x > y$

(b) if $x < y$

(c) if $x \geq y$

(d) if $x \leq y$

(e) if $x = y$ or no relation can be established between 'x' and 'y'.

1. I. $x^2 - 30x + 216 = 0$

II. $y^2 - 23y + 132 = 0$

2. I. $x^2 - 14x + 48 = 0$

II. $y^2 - y - 30 = 0$

3. I. $x^2 - 13x + 40 = 0$

II. $y^2 - 21y + 110 = 0$

4. I. $(x - 16)^2 = 0$

II. $y^2 = 256$

5. I. $x^2 + 15x + 36 = 0$

II. $4y^2 - 13y - 17 = 0$

6. I. $x^2 = 30 - x$

II. $y^2 - 13y + 40 = 0$

7. I. $x^2 - 37x + 300 = 0$

II. $y^2 - 43y + 372 = 0$

8. I. $10x^2 - 17x - 11 = 0$

II. $6y^2 + 19y + 15 = 0$

9. I. $x^2 - 4x - 221 = 0$

II. $y^2 - y - 132 = 0$

10. I. $x^2 - 8x + 15 = 0$

II. $y^2 - 13y + 40 = 0$

11. I. $x^2 + 5x - 234 = 0$

II. $y^3 = 2197$

12. I. $x^2 - 35x + 306 = 0$

II. $y^2 - 44y + 475 = 0$

13. I. $\frac{4}{\sqrt{x}} + \frac{2}{\sqrt{x}} = \sqrt{x}$

II. $\frac{8}{\sqrt{y}} + \frac{6}{\sqrt{y}} = \sqrt{y}$

14. I. $x^2 - 7x + 12 = 0$

II. $y^2 - 8y + 16 = 0$

15. I. $2x^2 + 13x + 15 = 0$

II. $3y^2 + 14y + 15 = 0$

16. I. $x^2 - 300 = 724$

II. $y - \sqrt{225} = \sqrt{289}$

17. I. $6x^2 - 7x + 2 = 0$

II. $12y^2 - 7y + 1 = 0$

18. I. $x^3 \times 14 = x^2 \times 98$

II. $y^{1/3} \times 12 = 108 \div y^{2/3}$

19. I. $y^2 - x^2 = 96$

II. $y - x = 8$

20. I. $x^2 = 4$

II. $y^2 + 4y + 4 = 0$

Answer:

1.c	2.c	3.b	4.c	5.b	6.d	7.e	8.a	9.e	10.d
11.d	12.b	13.b	14.d	15.e	16.d	17.a	18.b	19.b	20.c

Solution:

1. I. $x^2 - 30x + 216 = 0$

→ $x^2 - 18x - 12x + 216 = 0$

$$\rightarrow x(x - 18) - 12(x - 18) = 0$$

$$\rightarrow (x - 18)(x - 12) = 0$$

$$\therefore x = 18, 12$$

$$\text{II. } y^2 - 23y + 132 = 0$$

$$\rightarrow y^2 - 12y - 11y + 132 = 0$$

$$\rightarrow y(y - 12) - 11(y - 12) = 0$$

$$\rightarrow (y - 12)(y - 11) = 0$$

$$\therefore y = 12, 11$$

Clearly, $x \geq y$.

Hence, the option C is correct.

$$2. \text{ I. } x^2 - 14x + 48 = 0$$

$$\rightarrow x^2 - 8x - 6x + 48 = 0$$

$$\rightarrow x(x - 8) - 6(x - 8) = 0$$

$$\rightarrow (x - 8)(x - 6) = 0$$

$$\therefore x = 8, 6$$

$$\text{II. } y^2 - y - 30 = 0$$

$$\rightarrow y^2 - 6y + 5y - 30 = 0$$

$$\rightarrow y(y - 6) + 5(y - 6) = 0$$

$$\rightarrow (y - 6)(y + 5) = 0$$

$$\therefore y = 6, -5$$

Clearly, $x \geq y$.

Hence, the option C is correct.

3. I. $x^2 - 13x + 40 = 0$

→ $x^2 - 8x - 5x + 40 = 0$

→ $x(x - 8) - 5(x - 8) = 0$

→ $(x - 8)(x - 5) = 0$

∴ $x = 8, 5$

II. $y^2 - 21y + 110 = 0$

→ $y^2 - 11y - 10y + 110 = 0$

→ $y(y - 11) - 10(y - 11) = 0$

→ $(y - 11)(y - 10) = 0$

∴ $y = 11, 10$

Clearly, $x < y$.

Hence, the option B is correct.

4. I. $(x - 16)^2 = 0$

→ $x - 16 = 0$

→ $x = 16$

II. $y^2 = 256$

→ $y = \pm 16$

→ $y = 16, -16$

Clearly, $x \geq y$.

Hence, the option C is correct.

5. I. $x^2 + 15x + 36 = 0$

→ $x^2 + 12x + 3x + 36 = 0$

$$\Rightarrow x(x + 12) + 3(x + 12) = 0$$

$$\Rightarrow (x + 12)(x + 3) = 0$$

$$\therefore x = -12, -3$$

$$\text{II. } 4y^2 - 13y - 17 = 0$$

$$\Rightarrow 4y^2 - 17y + 4y - 17 = 0$$

$$\Rightarrow y(4y - 17) + 1(4y - 17) = 0$$

$$\Rightarrow (4y - 17)(y + 1) = 0$$

$$\therefore y = \frac{17}{4}, -1 = 4.25, -1$$

Clearly, $x < y$.

Hence, the option B is correct.

$$6. \text{ I. } x^2 = 30 - x$$

$$\Rightarrow x^2 + x - 30 = 0$$

$$\Rightarrow x^2 + 6x - 5x - 30 = 0$$

$$\Rightarrow x(x + 6) - 5(x + 6) = 0$$

$$\Rightarrow (x + 6)(x - 5) = 0$$

$$\therefore x = -6, 5$$

$$\text{II. } y^2 - 13y + 40 = 0$$

$$\Rightarrow y^2 - 8y - 5y + 40 = 0$$

$$\Rightarrow y(y - 8) - 5(y - 8) = 0$$

$$\Rightarrow (y - 8)(y - 5) = 0$$

$$\therefore y = 8, 5$$

Clearly, $x \leq y$.

Hence, the option D is correct.

7. I. $x^2 - 37x + 300 = 0$

→ $x^2 - 25x - 12x + 300 = 0$

→ $x(x - 25) - 12(x - 25) = 0$

→ $(x - 25)(x - 12) = 0$

∴ $x = 25, 12$

II. $y^2 - 43y + 372 = 0$

→ $y^2 - 31y - 12y + 372 = 0$

→ $y(y - 31) - 12(y - 31) = 0$

→ $(y - 31)(y - 12) = 0$

∴ $y = 31, 12$

When $x = 25$ & $y = 31$, then $x < y$

But if $x = 25$ & $y = 12$, then $x > y$

Hence, the option E is correct.

8. I. $10x^2 - 17x - 11 = 0$

→ $10x^2 - 22x + 5x - 11 = 0$

→ $2x(5x - 11) + 1(5x - 11) = 0$

→ $(5x - 11)(2x + 1) = 0$

∴ $x = \frac{11}{5}, -\frac{1}{2} = 2.2, -0.5$

II. $6y^2 + 19y + 15 = 0$

→ $6y^2 + 10y + 9y + 15 = 0$

→ $2y(3y + 5) + 3(3y + 5) = 0$

→ $(3y + 5)(2y + 3) = 0$

$$\therefore y = -\frac{5}{3}, -\frac{3}{2} = -1.67, -1.5$$

Clearly, $x > y$.

Hence, the option A is correct.

9. I. $x^2 - 4x - 221 = 0$

$$\rightarrow x^2 - 17x + 13x - 221 = 0$$

$$\rightarrow x(x - 17) + 13(x - 17) = 0$$

$$\rightarrow (x - 17)(x + 13) = 0$$

$$\therefore x = 17, -13$$

II. $y^2 - y - 132 = 0$

$$\rightarrow y^2 - 12y + 11y - 132 = 0$$

$$\rightarrow y(y - 12) + 11(y - 12) = 0$$

$$\rightarrow (y - 12)(y + 11) = 0$$

$$\therefore y = 12, -11$$

When $x = 17$ & $y = 12$, then $x > y$

But if $x = -13$ & $y = 12$, then $x < y$

Hence, the option E is correct.

10. I. $x^2 - 8x + 15 = 0$

$$\rightarrow x^2 - 5x - 3x + 15 = 0$$

$$\rightarrow x(x - 5) - 3(x - 5) = 0$$

$$\rightarrow (x - 5)(x - 3) = 0$$

$$\therefore x = 5, 3$$

II. $y^2 - 13y + 40 = 0$

$$\rightarrow y^2 - 8y - 5y + 40 = 0$$

$$\rightarrow y(y - 8) - 5(y - 8) = 0$$

$$\rightarrow (y - 8)(y - 5) = 0$$

$$\therefore y = 8, 5$$

Clearly $x \leq y$

Hence, the option D is correct.

$$11. I. x^2 + 5x - 234 = 0$$

$$\rightarrow x^2 + 18x - 13x - 234 = 0$$

$$\rightarrow x(x + 18) - 13(x + 18) = 0$$

$$\rightarrow (x + 18)(x - 13) = 0$$

$$\therefore x = -18, 13$$

$$II. y^3 = 2197$$

$$\therefore y = 13$$

Clearly $x \leq y$

Hence, the option D is correct.

$$12. I. x^2 - 35x + 306 = 0$$

$$\rightarrow x^2 - 18x - 17x + 306 = 0$$

$$\rightarrow x(x - 18) - 17(x - 18) = 0$$

$$\rightarrow (x - 18)(x - 17) = 0$$

$$\therefore x = 18, 17$$

$$II. y^2 - 44y + 475 = 0$$

$$\rightarrow y^2 - 25y - 19y + 475 = 0$$

$$\rightarrow y(y - 25) - 19(y - 25) = 0$$

$$\rightarrow (y - 25)(y - 19) = 0$$

$$\therefore y = 25, 19$$

Clearly, $x < y$

Hence, the option B is correct.

$$13. \text{ I. } \frac{4}{\sqrt{x}} + \frac{2}{\sqrt{x}} = \sqrt{x}$$

$$\rightarrow \frac{4+2}{\sqrt{x}} = \sqrt{x}$$

$$\rightarrow 6 = x$$

$$\rightarrow x = 6$$

$$\text{II. } \frac{8}{\sqrt{y}} + \frac{6}{\sqrt{y}} = \sqrt{y}$$

$$\rightarrow \frac{8+6}{\sqrt{y}} = \sqrt{y}$$

$$\rightarrow 14 = y$$

$$\rightarrow y = 14$$

Clearly, $x < y$

Hence, the option B is correct.

$$14. \text{ I. } x^2 - 7x + 12 = 0$$

$$\rightarrow x^2 - 4x - 3x + 12 = 0$$

$$\rightarrow x(x - 4) - 3(x - 4) = 0$$

$$\Rightarrow (x - 4)(x - 3) = 0$$

$$\therefore x = 4, 3$$

$$\text{II. } y^2 - 8y + 16 = 0$$

$$\Rightarrow y^2 - 4y - 4y + 16 = 0$$

$$\Rightarrow y(y - 4) - 4(y - 4) = 0$$

$$\Rightarrow (y - 4)(y - 4) = 0$$

$$\therefore y = 4, 4$$

Clearly, $x \leq y$

Hence, the option D is correct.

$$15. \text{ I. } 2x^2 + 13x + 15 = 0$$

$$\Rightarrow 2x^2 + 10x + 3x + 15 = 0$$

$$\Rightarrow 2x(x + 5) + 3(x + 5) = 0$$

$$\Rightarrow (x + 5)(2x + 3) = 0$$

$$\therefore x = -5, -\frac{3}{2} = -5, -1.5$$

$$\text{II. } 3y^2 + 14y + 15 = 0$$

$$\Rightarrow 3y^2 + 9y + 5y + 15 = 0$$

$$\Rightarrow 3y(y + 3) + 5(y + 3) = 0$$

$$\Rightarrow (y + 3)(y + 5) = 0$$

$$\therefore y = -3, -5$$

When $x = -5$ & $y = -3$, then $x < y$

But if $x = -1.5$ & $y = -3$, then $x > y$

Hence, the option E is correct.

16. I. $x^2 - 300 = 724$

$$\rightarrow x^2 = 724 + 300$$

$$\rightarrow x^2 = 1024$$

$$\rightarrow x = \pm 32$$

$$\rightarrow x = 32, -32$$

II. $y - \sqrt{225} = \sqrt{289}$

$$\rightarrow y - 15 = 17$$

$$\rightarrow y = 17 + 15$$

$$\rightarrow y = 32$$

Clearly, $x \leq y$

Hence, the option D is correct.

17. I. $6x^2 - 7x + 2 = 0$

$$\rightarrow 6x^2 - 4x - 3x + 2 = 0$$

$$\rightarrow 2x(3x - 2) - 1(3x - 2) = 0$$

$$\rightarrow (3x - 2)(2x - 1) = 0$$

$$\therefore x = \frac{2}{3}, \frac{1}{2} = 0.67, 0.5$$

II. $12y^2 - 7y + 1 = 0$

$$\Rightarrow 12y^2 - 4y - 3y + 1 = 0$$

$$\Rightarrow 4y(3y - 1) - 1(3y - 1) = 0$$

$$\Rightarrow (3y - 1)(4y - 1) = 0$$

$$\therefore y = \frac{1}{3}, \frac{1}{4} = 0.33, 0.25$$

Clearly, $x > y$

Hence, the option A is correct.

$$18. \text{ I. } x^3 \times 14 = x^2 \times 98$$

$$\Rightarrow \frac{x^3}{x^2} = \frac{98}{14}$$

$$\Rightarrow x = 7$$

$$\text{II. } y^{1/3} \times 12 = 108 \div y^{2/3}$$

$$\Rightarrow y^{1/3} \times 12 = \frac{108}{y^{2/3}}$$

$$\Rightarrow y^{1/3} \times y^{2/3} = \frac{108}{12}$$

$$\Rightarrow y^{(1/3 + 2/3)} = 9$$

$$\Rightarrow y = 9$$

Clearly, $x < y$

Hence, the option B is correct.

$$19. \text{ I. } y^2 - x^2 = 96$$

$$\Rightarrow (y + x)(y - x) = 96$$

$$\Rightarrow (y + x) * 8 = 96 \text{ ---Using equation(II)}$$

$$\Rightarrow y + x = 12$$

II. $y - x = 8$

Adding the two equations above, we get, $y = 10$ and $x = 2$

Clearly, $x < y$

Hence, the option B is correct.

20. I. $x^2 = 4$

→ $x = +2, -2$

II. $y^2 + 4y + 4 = 0$

→ $y^2 + 2y + 2y + 4 = 0$

→ $y(y + 2) + 2(y + 2) = 0$

→ $(y + 2)(y + 2) = 0$

→ $Y = -2, -2$

Clearly, $x \geq y$

Hence, the option C is correct.

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