

# Mathematical Inequality Assignment

1. (b)

(2) I.  $x^2 - 1 = 0 \Rightarrow (x+1)(x-1) = 0$   
 $\Rightarrow x = -1$  या  $1$   
 II.  $y^2 + 4y + 3 = 0$   
 $\Rightarrow y^2 + 3y + y + 3 = 0$   
 $\Rightarrow y(y+3) + 1(y+3) = 0$   
 $\Rightarrow (y+1)(y+3) = 0 \Rightarrow y = -1$  या  $-3$   
 स्पष्टतः  $x \geq y$

2. (d)

(4) I.  $x^2 - 7x + 12 = 0$   
 $\Rightarrow x^2 - 4x - 3x + 12 = 0$   
 $\Rightarrow x(x-4) - 3(x-4) = 0$   
 $\Rightarrow (x-3)(x-4) = 0 \Rightarrow x = 3$  या  $4$   
 II.  $y^2 - 12y + 32 = 0$   
 $\Rightarrow y^2 - 8y - 4y + 32 = 0$   
 $\Rightarrow y(y-8) - 4(y-8) = 0$   
 $\Rightarrow (y-4)(y-8) = 0 \Rightarrow y = 4$  या  $8$   
 स्पष्टतः  $x \leq y$

3. (c)

(3) I.  $x^3 - 371 = 629$   
 $\Rightarrow x^3 = 371 + 629 = 1000$   
 $\Rightarrow x = \sqrt[3]{1000} = 10$   
 II.  $y^3 = 543 + 788 = 1331$   
 $\Rightarrow y = \sqrt[3]{1331} = 11$   
 स्पष्टतः  $x < y$

4. (a)

(1) समीकरण I  $\times 3$  - समीकरण II  $\times 5$  से,  
 $15x + 6y - 15x - 35y = 93 - 180$   
 $\Rightarrow -29y = -87 \Rightarrow y = \frac{87}{29} = 3$   
 समीकरण I से,  $5x + 2 \times 3 = 31$   
 $\Rightarrow 5x = 31 - 6 = 25 \Rightarrow x = 5$   
 स्पष्टतः  $x > y$

5. (e)

(5) I.  $2x^2 + 11x + 12 = 0$   
 $\Rightarrow 2x^2 + 8x + 3x + 12 = 0$   
 $\Rightarrow 2x(x+4) + 3(x+4) = 0$   
 $\Rightarrow (x+4)(2x+3) = 0$   
 $\Rightarrow x = -4$  या  $-\frac{3}{2}$   
 II.  $5y^2 + 27y + 10 = 0$   
 $\Rightarrow 5y^2 + 25y + 2y + 10 = 0$   
 $\Rightarrow 5y(y+5) + 2(y+5) = 0$   
 $\Rightarrow (y+5)(5y+2) = 0$   
 $\Rightarrow y = -5$  या  $-\frac{2}{5}$

6. (c)

(3) I.  $2x^2 + 7x + 4x + 14 = 0$   
 $\Rightarrow x(2x+7) + 2(2x+7) = 0$   
 $\Rightarrow (x+2)(2x+7) = 0$

$\therefore x = -2$  या  $-\frac{7}{2}$

II.  $4y^2 + 2.2y.3 + 9 = 0$   
 $\Rightarrow (2y+3)^2 = 0 \Rightarrow 2y+3 = 0$

$\therefore y = -\frac{3}{2}$  स्पष्टतः  $x < y$

7. (a)

(1) I.  $(x-2)(x+2) = 0$   
 $\therefore x = 2$  या  $-2$

II.  $y^2 + 2.y.3 + 9 = 0$   
 $\Rightarrow (y+3)^2 = 0 \Rightarrow y+3 = 0$

$\therefore y = -3$   
 स्पष्टतः  $x > y$

8. (b)

(2) I.  $x^2 - 4x - 3x + 12 = 0$   
 $\Rightarrow x(x-4) - 3(x-4) = 0$

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

II.  $y^2 + 4y - 3y - 12 = 0$   
 $\Rightarrow y(y+4) - 3(y+4) = 0$

$\Rightarrow (y-3)(y+4) = 0$   
 $\therefore y = 3$  या  $-4$

स्पष्टतः  $x \geq y$

9. (d)

(4) I.  $x^2 = 729$

$\therefore x = \sqrt{729} = \pm 27$

II.  $y = \sqrt{729} = +27$

स्पष्टतः  $x \leq y$

10. (e)

(5) I.  $x^4 = 227 + 398 = 625 = 5^4$   
 $\Rightarrow x = 5$

II.  $y^2 = 346 - 321 = 25 = 5^2 \Rightarrow y = 5$

स्पष्टतः  $x = y$

11. (b)

(2) I.  $x^2 - x - 12 = 0$   
 $\Rightarrow x^2 - 4x + 3x - 12 = 0$

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

$\therefore x = 4$  या  $-3$

II.  $y^2 + 5y + 6 = 0$   
 $\Rightarrow y^2 + 3y + 2y + 6 = 0$

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

$\therefore y = -3$  या  $-2$

स्पष्टतः  $x \geq y$

12. (a)

(1) I.  $x^2 - 8x + 15 = 0$

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

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

$\therefore x = 3$  या  $5$

II.  $y^2 - 3y + 2 = 0$

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

$\Rightarrow y(y-2) - 1(y-2) = 0$   
 $\Rightarrow (y-1)(y-2) = 0$   
 $\therefore y = 1$  या  $2$

स्पष्टतः  $x > y$

13. (e)

(5) I.  $x^2 = 32 + 112 = 144$

$\therefore x = \sqrt{144} = \pm 12$

II.  $y = \sqrt{169} = \pm 13$

14. (e)

(5) I.  $x = \sqrt{121} = \pm 11$

II.  $y^2 = 121$

$\therefore y = \sqrt{121} = \pm 11$

15. (d)

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

$\Rightarrow x = \pm 4$

II.  $y^2 - 9y + 20 = 0$

$\Rightarrow y^2 - 4y - 5y + 20 = 0$

$\Rightarrow y(y-4) - 5(y-4) = 0$

$\Rightarrow (y-5)(y-4) = 0$

$\therefore y = 5$  या  $4$

स्पष्टतः  $x \leq y$

16. (3)

(3) I.  $3x^2 + 8x + 4 = 0$

$\Rightarrow 3x^2 + 6x + 2x + 4 = 0$

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

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

$\therefore x = -2$  या  $-\frac{2}{3}$

II.  $4y^2 - 19y + 12 = 0$

$\Rightarrow 4y^2 - 16y - 3y + 12 = 0$

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

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

$\therefore y = 4$  या  $\frac{3}{4}$

स्पष्टतः  $x < y$

17. (d)

(4) I.  $x^2 + x - 20 = 0$

$\Rightarrow x^2 + 5x - 4x + 20 = 0$

$\Rightarrow x(x+5) - 4(x+5) = 0$

$\Rightarrow (x+5)(x-4) = 0$

$\therefore x = -5$  या  $4$

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

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

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

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

$\therefore y = 6$  या  $-5$

स्पष्टतः,  $x \leq y$

18. (d)

(4) I.  $x^2 = 365 + 364 = 729$

$\therefore x = \sqrt{729} = \pm 27$

II.  $y - \sqrt{324} = \sqrt{81}$

$\Rightarrow y - 18 = 9$

$\Rightarrow y = 27$

स्पष्टतः,  $x \leq y$

19. (e)

(5) I.  $4 + 7 = \sqrt{x} \times \sqrt{x}$   
 $\Rightarrow x = 11$

II.  $y^2 - \frac{11^{5/2}}{\sqrt{y}} = 0$

$\Rightarrow y^{2+\frac{1}{2}} = 11^{5/2}$

$\Rightarrow y^{5/2} = 11^{5/2}$

$\Rightarrow y = 11$

स्पष्टतः,  $x = y$

20. (e)

(5) I.  $225x^2 = 4$

$\Rightarrow x^2 = \frac{4}{225} \Rightarrow x = \pm \frac{2}{15}$

II.  $\sqrt{225y} + 2 = 0$

$\Rightarrow \sqrt{225y} = -2$

वर्ग करने पर,

$225y = 4$

$\Rightarrow y = \frac{4}{225}$

21. (a)

I.  $5x^2 - 18x + 9 = 0$

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

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

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

$\therefore x = 3$  या  $\frac{3}{5}$

II.  $20y^2 - 13y + 2 = 0$

$\Rightarrow 20y^2 - 8y - 5y + 2 = 0$

$\Rightarrow 4y(5y-2) - 1(5y-2) = 0$

$\Rightarrow (4y-1)(5y-2) = 0$

स्पष्टतः  $x > y$

22. (b)

I.  $x^3 = 878 + 453 = 1331$

$\therefore x = \sqrt[3]{1331} = 11$

II.  $y^2 = 82 + 39 = 121$

$\therefore y = \sqrt{121} = \pm 11$

23. (e)

I.  $\frac{3}{\sqrt{x}} + \frac{4}{\sqrt{x}} = \sqrt{x}$

$\Rightarrow 3 + 4 = x \Rightarrow x = 7$

II.  $y^3 - \frac{(7)^2}{\sqrt{y}} = 0$

$\Rightarrow y^{3+\frac{1}{2}} - (7)^2 = 0$

$\Rightarrow y^{\frac{7}{2}} = 7^2 \Rightarrow y = 7$

24. (e)

I.  $9x - 4x = 54.55 + 15.45$   
 $\Rightarrow 5x = 70 \Rightarrow x = 14$

II.  $\sqrt{y+155} = 7 + 6 = 13$

$\Rightarrow y + 155 = 169$

$\Rightarrow y = 169 - 155 = 14$

25. (c)

I.  $x^2 + 11x + 30 = 0$

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

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

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

$\therefore x = -5$  या  $-6$

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

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

$\Rightarrow y(y+4) + 3(y+4) = 0$

$\Rightarrow (y+3)(y+4) = 0$

$\therefore y = -3$  या  $-4$

स्पष्टतः,  $x < y$

26. (a)

From III and I

$29x + 2y = 190 \quad \dots(i)$

From III and II

$23x + y = 146 \quad \dots(ii)$

Again from (i) and (ii), we get

$x = 6, y = 8$  and  $z = 8$

$\therefore x < y = z$

27. (c)

From II and I

$x = 8$

From III  $z = 15 - 8 = 7$

and  $y = 9$

$\therefore x < y > z$

28. (e)

$x = \sqrt{6 \times 6} = 6$

From II and III

$4z = 28$

$\therefore z = 7$

again  $2y = 33 - 21 = 12$

$\therefore y = 6$

$\therefore x = y < z$

29. (d)

From equation I and II

$8x + 7y = 135 \} \times 6$

$5x + 6y = 99 \} \times 7$

$(48x - 35x) = 810 - 693$

$\therefore 13x = 117$

$\therefore x = 9$

and  $y = \frac{99 - 45}{6} = \frac{54}{6} = 9$

and  $z = \frac{121 - 81}{8} = \frac{40}{8} = 5$

$\therefore x = y > z$

30. (e)

From I  $x + y = 11$

and III  $xy = 28$

$x = 7$  and  $y = 4$

again,  $7 - 4 + z = 0$

$\therefore z = -3$

$x > y > z$

31. (d)

I.  $4a^2 - 20a + 21 = 0$

$\Rightarrow (2a-3)(2a-7) = 0$

$\Rightarrow a = \frac{3}{2}$  or  $\frac{7}{2}$

II.  $2b^2 - 5b + 3 = 0$

$\Rightarrow (b-1)(2b-3) = 0$

$\Rightarrow b = 1$  or  $\frac{3}{2}$

$\therefore a \geq b$

32. (b)

I.  $6a^2 - 25a + 25 = 0$

$\Rightarrow (2a-5)(3a-5) = 0$

$\Rightarrow a = \frac{5}{2}$  or  $\frac{5}{3}$

II.  $15b^2 - 16b + 4 = 0$

$\Rightarrow (3b-2)(5b-2) = 0$

$\Rightarrow b = \frac{2}{3}$  or  $\frac{2}{5}$

$\therefore a > b$

33. (c)

I.  $a^2 = 4$

$\Rightarrow a = \pm 2$

II.  $b^2 = 9$

$\Rightarrow b = \pm 3$

$\therefore$  Relationship between  $a$  and  $b$  cannot be established

34. (a)

I.  $2a^2 + 3a + 1 = 0$

$\Rightarrow (2a+1)(a+1) = 0$

$\Rightarrow a = -\frac{1}{2}$  or  $-1$

II.  $12b^2 + 7b + 1 = 0$

$\Rightarrow (4b+1)(3b+1) = 0$

$\Rightarrow b = -\frac{1}{4}$  or  $-\frac{1}{3}$

$\therefore a < b$

35. (e)

I.  $a^2 + 5a + 6 = 0$

$\Rightarrow (a+2)(a+3) = 0$

$\Rightarrow a = -2$  or  $-3$

II.  $b^2 + 3b + 2 = 0$

$\Rightarrow (b+1)(b+2) = 0$

$\Rightarrow b = -1$  or  $-2$

$\therefore a \leq b$