



Quadratic Equations

Questions PDF



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Q1.

I. $2x^2 - 3x - 14 = 0$,
 II. $3y^2 + 16y + 20 = 0$

Q2.

I. $2x^2 + 17x + 30 = 0$,
 II. $2y^2 + 13y + 18 = 0$

Q3.

I. $3x^2 + 22x + 24 = 0$,
 II. $3y^2 - 10y + 3 = 0$

Q4.

I. $20x^2 - 31x + 12 = 0$,
 II. $6y^2 - 7y + 2 = 0$

Q5.

I. $2x^2 + 5x - 12 = 0$,
 II. $2y^2 - 19y + 35 = 0$

Q6.

I. $4x^2 - 11x + 6 = 0$,
 II. $6y^2 - 29y + 28 = 0$

Q7.

I. $3x^2 - 2x - 8 = 0$,
 II. $6y^2 - 17y + 10 = 0$

Q8.

I. $3x^2 + 20x + 32 = 0$,
 II. $3y^2 - 4y - 4 = 0$

Q9.

I. $3x^2 + 13x + 14 = 0$,
 II. $4y^2 + 9y + 2 = 0$

Q10.

I. $5x^2 - 8x - 4 = 0$,
 II. $5y^2 - 23y - 10 = 0$

Q11.

I. $6x^2 + 7x - 3 = 0$
 II. $y(10y - 1) = 2$

Q12.

I. $x^2 - 9x + 20 = 0$
 II. $y^2 - 11y + 30 = 0$

Q13.

I. $x^2 + 5x - 14 = 0$
 II. $y^2 + 24y + 128 = 0$

Q14.

I. $3x^2 + 16x + 20 = 0$
 II. $3y^2 - 14y - 5 = 0$

Q15.

I. $20x^2 - 31x + 12 = 0$
 II. $4y^2 + 5y - 6 = 0$

Q16.

I. $2x^2 - 19x + 42 = 0$
 II. $3y^2 - 13y + 12 = 0$

Q17.

I. $3x^2 + 19x + 28 = 0$
 II. $3y^2 + 13y + 14 = 0$

Q18.

I. $3x^2 + 23x + 30 = 0$
 II. $3y^2 - 4y - 4 = 0$

Q19.

I. $2x^2 - 7x + 3 = 0$
 II. $2y^2 + 11y + 12 = 0$

Q20.

I. $x^2 + 14x + 45 = 0$
 II. $3y^2 - y - 10 = 0$

Q21.

I. $3x^2 + 22x + 35 = 0$
 II. $6y^2 + 11y - 7 = 0$

Q22.

I. $3x^2 - 14x + 8 = 0$
 II. $3y^2 - 20y + 12 = 0$

Q23.

I. $3x^2 - 23x + 40 = 0$
 II. $3y^2 - 8y + 4 = 0$

Q24.

I. $6x^2 + x - 2 = 0$
 II. $3y^2 - 22y + 40 = 0$

Q25.

I. $x^2 = 1156$,
 II. $y = \sqrt{1156}$

Q26.

I. $x^2 - \sqrt{3969} = \sqrt{6561}$,
 II. $y^2 - \sqrt{1296} = \sqrt{4096}$

Q27.

I. $3x^2 - 25x + 52 = 0$,
 II. $15y^2 - 38y - 40 = 0$

Q28.

I. $4x^2 + 13x + 10 = 0$
 II. $4y^2 - 7y - 15 = 0$

Q29.

I. $3x^2 + 14x - 5 = 0$,
 II. $3y^2 - 19y + 6 = 0$

Q30.

I. $3x^2 + 19x + 28 = 0$,
 II. $6y^2 - y - 2 = 0$



Solutions:

S1. $x \geq y$

$$2x^2 - 3x - 14 = 0$$

$$2x^2 + 4x - 7x - 14 = 0$$

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

$$\text{Gives } x = -2, 7/2$$

$$3y^2 + 16y + 20 = 0$$

$$3y^2 + 6y + 10y + 20 = 0$$

$$3y(y+2) + 10(y+2) = 0$$

$$\text{Gives } y = -10/3, -2$$

S2. If $x = y$ or cannot be established

$$2x^2 + 17x + 30 = 0$$

$$2x^2 + 12x + 5x + 30 = 0$$

$$\text{So } x = -6, -5/2$$

$$2y^2 + 13y + 18 = 0$$

$$2y^2 + 4y + 9y + 18 = 0$$

$$\text{So } y = -9/2, -2$$

Put on number line

$$-6 \dots -9/2 \dots -5/2 \dots -2$$

S3. If $x < y$

$$3x^2 + 22x + 24 = 0$$

$$3x^2 + 18x + 4x + 24 = 0$$

$$\text{So } x = -4/3, -6$$

$$3y^2 - 10y + 3 = 0$$

$$3y^2 - 9y - y + 3 = 0$$

$$\text{So } y = 1/3, 3$$

Put on number line

$$-6 \dots -4/3 \dots 1/3 \dots 3$$

S4. If $x > y$

$$20x^2 - 31x + 12 = 0$$

$$20x^2 - 16x - 15x + 12 = 0$$

$$\text{So } x = 3/4, 4/5$$

$$6y^2 - 7y + 2 = 0$$

$$6y^2 - 3y - 4y + 2 = 0$$

$$\text{So } y = 1/2, 2/3$$

Put on number line

$$1/2 \dots 2/3 \dots 3/4 \dots 4/5$$

S5. $x < y$

$$2x^2 + 5x - 12 = 0$$

$$2x^2 + 8x - 3x - 12 = 0$$

$$\text{So } x = -4, 3/2$$

$$2y^2 - 19y + 35 = 0$$

$$2y^2 - 14y - 5y + 35 = 0$$

$$\text{So } y = 5/2, 7$$

Put on number line

$$-4 \dots 3/2 \dots 5/2 \dots 7$$

S6. $x = y$ or relationship cannot be determined

$$4x^2 - 11x + 6 = 0$$

$$4x^2 - 8x - 3x + 6 = 0$$

$$\text{So } x = 3/4, 2$$

$$6y^2 - 29y + 28 = 0$$

$$6y^2 - 8y - 21y + 28 = 0$$

$$\text{So } y = 4/3, 7/2$$

Put on number line

$$3/4 \dots 4/3 \dots 2 \dots 7/2$$

S7. $x \leq y$

$$3x^2 - 2x - 8 = 0$$

$$3x^2 - 6x + 4x - 8 = 0$$

$$\text{So } x = -4/3, 2$$

$$6y^2 - 17y + 10 = 0$$

$$6y^2 - 12y - 5y + 10 = 0$$

$$\text{So } y = 5/6, 2$$

Put on number line

$$-4/3 \dots 2 \dots 5/6$$

S8. $x < y$

$$3x^2 + 20x + 32 = 0$$

$$3x^2 + 12x + 8x + 32 = 0$$

$$\text{So } x = -4, -8/3$$

$$3y^2 - 4y - 4 = 0$$

$$3y^2 - 6y + 2y - 4 = 0$$

$$\text{So } y = -2/3, 2$$

Put on number line

$$-4 \dots -8/3 \dots -2/3 \dots 2$$

S9. $x \leq y$

$$3x^2 + 13x + 14 = 0$$

$$3x^2 + 6x + 7x + 14 = 0$$

$$\text{So } x = -7/3, -2$$

$$4y^2 + 9y + 2 = 0$$

$$4y^2 + 8y + y + 2 = 0$$

$$\text{So } y = -2, -1/4$$

Put on number line

$$-7/3 \dots -2 \dots -1/4$$

S10. $x = y$ or relation cannot be established

$$5x^2 - 8x - 4 = 0$$

$$5x^2 - 10x + 2x - 4 = 0$$

$$\text{So } x = -2/5, 2$$

$$5y^2 - 23y - 10 = 0$$

$$5y^2 - 25y + 2y - 10 = 0$$

$$\text{So } y = -2/5, 5$$

Put on number line

$$-2/5 \dots 2 \dots 5$$

S11. cannot be established

$$6x^2 + 7x - 3 = 0$$

$$6x^2 + 9x - 2x - 3 = 0$$

$$\text{So } x = -1.5, 0.3$$

$$y(10y - 1) = 2$$

$$10y^2 - y - 2 = 0$$

$$10y^2 - 5y + 4y - 2 = 0$$

$$\text{So } y = 0.5, -0.4$$

Put on number line

$$-1.5 \dots -0.4 \dots 0.3 \dots 0.5$$

S12. $x \leq y$

$$x^2 - 9x + 20 = 0$$

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

$$\text{So } x = 4, 5$$

$$y^2 - 11y + 30 = 0$$

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

$$\text{So } y = 5, 6$$

Put on number line

$$4 \dots 5 \dots 5 \dots 6$$



S13. $x > y$

$$x^2 + 5x - 14 = 0$$

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

So $x = -7, 2$

$$y^2 + 24y + 128 = 0$$

$$y^2 + 16y + 8y + 128 = 0$$

So $y = -16, -8$

Put on number line

-16.....-8..... -7....2

S14. $x < y$

$$3x^2 + 16x + 20 = 0$$

$$3x^2 + 6x + 10x + 20 = 0$$

Gives $x = -2, -10/3$

$$3y^2 - 14y - 5 = 0$$

$$3y^2 - 15y + y - 5 = 0$$

Gives $y = -1/3, 5$

Put all values on number line

and analyze the relationship

-10/3... -2.... -1/3.... 5

S15. $x \geq y$

$$20x^2 - 31x + 12 = 0$$

$$20x^2 - 16x - 15x + 12 = 0$$

Gives $x = 3/4, 4/5$

$$4y^2 + 5y - 6 = 0$$

$$4y^2 + 5y - 6 = 0$$

Gives $y = -2, 3/4$

Put all values on number line

and analyze the relationship

-2.... 3/4... 4/5

S16. $x > y$

$$2x^2 - 19x + 42 = 0$$

$$2x^2 - 12x - 7x + 42 = 0$$

Gives $x = 7/2, 6$

$$3y^2 - 13y + 12 = 0$$

$$3y^2 - 9y + 4y + 12 = 0$$

Gives $y = 4/3, 3$

Put all values on number line

and analyze the relationship

4/3..... 3..... 7/2..... 6

S17. $x \leq y$

$$3x^2 + 19x + 28 = 0$$

$$3x^2 + 12x + 7x + 28 = 0$$

Gives $x = -4, -7/3$

$$3y^2 + 13y + 14 = 0$$

$$3y^2 + 6y + 7y + 14 = 0$$

Gives $y = -7/3, -2$

Put all values on number line

and analyze the relationship

-4..... -7/3..... -2

S18. $x < y$

$$3x^2 + 23x + 30 = 0$$

$$3x^2 + 18x + 5x + 30 = 0$$

Gives $x = -5/3, -6$

$$3y^2 - 4y - 4 = 0$$

$$3y^2 - 6y + 2y - 4 = 0$$

Gives $y = 2, -2/3$

Put all values on number line

and analyze the relationship

-6.... -5/3..... -2/3..... 2

S19. $x > y$

$$2x^2 - 7x + 3 = 0$$

$$2x^2 - 6x - x + 3 = 0$$

Gives $x = 3, 1/2$

$$2y^2 + 11y + 12 = 0$$

$$2y^2 + 8y + 3y + 12 = 0$$

Gives $y = -3/2, -4$

Put all values on number line

and analyze the relationship

-4..... -3/2..... 1/2..... 3

S20. $x < y$

$$x^2 + 14x + 45 = 0$$

$$x^2 + 9x + 5x + 45 = 0$$

Gives $x = -9, -5$

$$3y^2 - y - 10 = 0$$

$$3y^2 - 6y + 5y - 10 = 0$$

Gives $y = -5/3, 2$

Put all values on number line

and analyze the relationship

-9..... -5..... -5/3..... 2

S21. $x \leq y$

$$3x^2 + 22x + 35 = 0$$

$$3x^2 + 15x + 7x + 35 = 0$$

Gives $x = -5, -7/3$

$$6y^2 + 11y - 7 = 0$$

$$6y^2 - 3y + 14y - 7 = 0$$

Gives $y = 1/2, -7/3$

Put all values on number line

and analyze the relationship

-5..... -7/3..... 1/2

S22. $x = y$ or relation cannot be established

$$-14x + 8 = 0$$

$$3x^2 - 12x - 2x + 8 = 0$$

Gives $x = 4, 2/3$

$$3y^2 - 20y + 12 = 0$$

$$3y^2 - 18y - 2y + 12 = 0$$

Gives $y = 2/3, 6$

Put all values on number line

and analyze the relationship

2/3..... 4..... 6

S23. $x > y$

$$3x^2 - 23x + 40 = 0$$

$$3x^2 - 15x - 8x + 40 = 0$$

Gives $x = 5, 8/3$

$$3y^2 - 8y + 4 = 0$$

$$3y^2 - 6y - 2y + 4 = 0$$

Gives $y = 2/3, 2$

Put all values on number line

and analyze the relationship

2/3..... 2..... 8/3..... 5

S24. $x < y$

$$6x^2 + x - 2 = 0$$

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

Gives $x = 1/2, -2/3$

$$3y^2 - 22y + 40 = 0$$

$$3y^2 - 12y - 10y + 40 = 0$$

Gives $y = 10/3, 4$

Put on number line

-2/3..... 1/2..... 10/3..... 4



S25. $x \leq y$

$$x^2 = 1156,$$

So $x = -34, 34$

$$y = \sqrt{1156}$$

So $y = 34$ (Square root cannot have -ve value)

Put on number line

$$-34 \dots 34$$

S26. $x = y$ or relation cannot be established

$$x^2 - \sqrt{3969} = \sqrt{6561}$$

$$x^2 - 63 = 81$$

$$x^2 = 144$$

So $x = -12, 12$

$$y^2 - \sqrt{1296} = \sqrt{4096}$$

$$y^2 - 36 = 64$$

$$y^2 = 100$$

So $y = -10, 10$

Put all values on number line and analyze the relationship

$$-12 \dots -10 \dots 10 \dots 12$$

S27. $x > y$

$$3x^2 - 25x + 52 = 0$$

$$3x^2 - 12x - 13x + 52 = 0$$

Gives $x = 4, 13/3$

$$15y^2 - 38y - 40 = 0$$

$$15y^2 + 12y - 50y - 40 = 0$$

Gives $y = -4/5, 10/3$

Put on number line

$$-4/5 \dots 10/3 \dots 4 \dots 13/3$$

S28. $x \leq y$

$$4x^2 + 13x + 10 = 0$$

$$4x^2 + 8x + 5x + 10 = 0$$

Gives $x = -2, -5/4$

$$4y^2 - 7y - 15 = 0$$

$$4y^2 - 12y + 5y - 15 = 0$$

Gives $y = -5/4, 3$

Put all values on number line and analyze the relationship

$$-2 \dots -5/4 \dots 3$$

S29. $x \leq y$

$$3x^2 + 14x - 5 = 0$$

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

Gives $x = -5, 1/3$

$$3y^2 - 19y + 6 = 0$$

$$3y^2 - 18y - y + 6 = 0$$

Gives $y = 1/3, 6$

Put on number line

$$-5 \dots 1/3 \dots 6$$

S30. $x < y$

$$3x^2 + 19x + 28 = 0$$

$$3x^2 + 12x + 7x + 28 = 0$$

Give $x = -4, -7/3$

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

$$6y^2 + 3y - 4y - 2 = 0$$

Gives $y = -1/2, 2/3$

Put on number line

$$-4 \dots -7/3 \dots -1/2 \dots 2/3$$



- Q31.
I. $3x^2 + 10x + 7 = 0$
II. $2y^2 - 5y - 12 = 0$
- Q32.
I. $4x^2 + 15x + 9 = 0$
II. $4y^2 - 13y - 12 = 0$
- Q33.
I. $3x^2 + 7x - 6 = 0$,
II. $6y^2 - y - 2 = 0$
- Q34.
I. $20x^2 - 31x + 12 = 0$
II. $3y^2 - 16y + 16 = 0$
- Q35.
I. $3x^2 + 22x + 24 = 0$
II. $2y^2 - 5y - 12 = 0$
- Q36.
I. $5x^2 + 23x + 12 = 0$
II. $5y^2 - 7y - 6 = 0$
- Q37.
I. $20x^2 - 31x + 12 = 0$,
II. $4y^2 + 9y - 9 = 0$
- Q38.
I. $3x^2 - 25x + 52 = 0$,
II. $5y^2 - 18y + 9 = 0$
- Q39.
I. $4x^2 - 5x - 6 = 0$,
II. $5y^2 - 7y - 6 = 0$
- Q40.
I. $2x^2 + 17x + 30 = 0$,
II. $4y^2 - 7y - 15 = 0$
- Q41.
I. $2x^2 + 17x + 21 = 0$,
II. $2y^2 + 13y + 15 = 0$
- Q42.
I. $3x^2 + 22x + 24 = 0$,
II. $3y^2 - 8y - 16 = 0$
- Q43.
I. $x^2 - 652 = 504$,
II. $y = \sqrt{1156}$
- Q44.
I. $9/\sqrt{x} + 8/(\sqrt{x} + 1) = 5$,
II. $12/\sqrt{y} - 4/\sqrt{y} = 2$
- Q45.
I. $3x^2 - 6x - \sqrt{3}x + 2\sqrt{3} = 0$, II.
 $2y^2 - 3y - 2\sqrt{2}y + 3\sqrt{2} = 0$
- Q46.
I. $3x^2 + 2x - 21 = 0$,
II. $3y^2 - 19y + 28 = 0$
- Q47.
I. $16x^2 + 8x - 15 = 0$,
II. $4y^2 + 29y + 30 = 0$
- Q48.
I. $2x^2 - (6 + \sqrt{3})x + 3\sqrt{3} = 0$,
II. $3y^2 - (9 + \sqrt{3})y + 3\sqrt{3} = 0$
- Q49.
I. $12x^2 - 5x - 3 = 0$,
II. $4y^2 - 11y + 6 = 0$
- Q50.
I. $2x^2 - 15\sqrt{3}x + 84 = 0$,
II. $3y^2 - 2y - 8 = 0$
- Q51.
I. $12x^2 - 49x + 30 = 0$,
II. $6y^2 - 35y + 50 = 0$
- Q52.
I. $12x^2 - 5x - 3 = 0$,
II. $6y^2 + y - 2 = 0$
- Q53.
I. $5x^2 - 36x - 32 = 0$,
II. $3y^2 + 16y + 20 = 0$
- Q54.
I. $2x^2 + (4 + 2\sqrt{6})x + 4\sqrt{6} = 0$
II. $5y^2 + (10 + \sqrt{6})y + 2\sqrt{6} = 0$
- Q55.
I. $3x^2 - 25x + 52 = 0$,
II. $3y^2 - 16y + 16 = 0$
- Q56.
I. $2x^2 - 9x + 4 = 0$,
II. $2y^2 - 17y + 36 = 0$
- Q57.
I. $3x^2 + 7x - 6 = 0$,
II. $3y^2 - 19y + 20 = 0$
- Q58.
I. $4x^2 - 12x + 5 = 0$,
II. $2y^2 + 3y - 20 = 0$
- Q59.
I. $3x^2 + (3 + 2\sqrt{2})x + 2\sqrt{2} = 0$
II. $5y^2 + (2 + 5\sqrt{2})y + 2\sqrt{2} = 0$
- Q60.
I. $7x^2 + 19x - 6 = 0$,
II. $2y^2 + 13y + 21 = 0$



S31. $x = y$ or relation cannot be established

$$3x^2 + 10x + 7 = 0$$

$$3x^2 + 3x + 7x + 7 = 0$$

$$\text{Gives } x = -1, -7/3$$

$$2y^2 - 5y - 12 = 0$$

$$2y^2 - 8y + 3y - 12 = 0$$

$$\text{Gives } y = -3/2, 4$$

S32. $x \leq y$

$$4x^2 + 15x + 9 = 0$$

$$4x^2 + 12x + 3x + 9 = 0$$

$$\text{Gives } x = -3, -3/4$$

$$4y^2 - 13y - 12 = 0$$

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

$$\text{Gives } y = -3/4, 4$$

S33. $x = y$ or relation cannot be established

$$3x^2 + 7x - 6 = 0$$

$$3x^2 + 9x - 2x - 6 = 0$$

$$\text{Gives } x = -3, 2/3$$

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

$$6y^2 + 3y - 4y - 2 = 0$$

$$\text{Gives } y = -1/2, 2/3$$

S34. $x < y$

$$20x^2 - 31x + 12 = 0$$

$$20x^2 - 16x - 15x + 12 = 0$$

$$\text{So } x = 3/4, 4/5$$

$$3y^2 - 16y + 16 = 0$$

$$3y^2 - 14y - 4y + 16 = 0$$

$$\text{Gives } y = 4, 4/3$$

S35. $x = y$ or relation cannot be established

$$3x^2 + 22x + 24 = 0$$

$$3x^2 + 18x + 4x + 24 = 0$$

$$\text{So } x = -4/3, -6$$

$$2y^2 - 5y - 12 = 0$$

$$2y^2 - 8y + 3y - 12 = 0$$

$$\text{Gives } y = -3/2, 4$$

S36. $x \leq y$

$$5x^2 + 23x + 12 = 0$$

$$5x^2 + 20x + 3x + 12 = 0$$

$$\text{So } x = -4, -3/5$$

$$5y^2 - 7y - 6 = 0$$

$$5y^2 - 10y + 3y - 6 = 0$$

$$\text{So } y = -3/5, 2$$

Put all values on number line and analyze the relationship

$$-4 \dots -3/5 \dots 2$$

S37. $x \geq y$

$$20x^2 - 31x + 12 = 0$$

$$20x^2 - 16x - 15x + 12 = 0$$

$$\text{Gives } x = 3/4, 4/5$$

$$4y^2 + 9y - 9 = 0$$

$$4y^2 + 12y - 3y - 9 = 0$$

$$y = 3/4, -3$$

S38. If $x > y$

$$3x^2 - 25x + 52 = 0$$

$$3x^2 - 12x - 13x + 52 = 0$$

$$\text{So } x = 4, 13/3$$

$$5y^2 - 18y + 9 = 0$$

$$5y^2 - 15y - 3y + 9 = 0$$

$$\text{So } y = 3/5, 3$$

Put on number line

$$-1/2 \dots 3/5 \dots 2/3 \dots 3$$

S39. If $x = y$ or relation cannot be established

$$4x^2 - 5x - 6 = 0$$

$$4x^2 - 8x + 3x - 6 = 0$$

$$\text{So } x = -3/4, 2$$

$$5y^2 - 7y - 6 = 0$$

$$5y^2 - 10y + 3y - 6 = 0$$

$$\text{So } y = -3/5, 2$$

S40. If $x < y$

$$2x^2 + 17x + 30 = 0$$

$$2x^2 + 12x + 5x + 30 = 0$$

$$\text{So } x = -6, -5/2$$

$$4y^2 - 7y - 15 = 0$$

$$4y^2 - 12y + 5y - 15 = 0$$

$$\text{So } y = -5/4, 3$$

S41. If $x = y$ or relation cannot be established

$$2x^2 + 17x + 21 = 0$$

$$2x^2 + 14x + 3x + 21 = 0$$

$$\text{So } x = -7, -3/2$$

$$2y^2 + 13y + 15 = 0$$

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

$$\text{So } y = -5, -3/2$$

S42. If $x \leq y$

$$3x^2 + 22x + 24 = 0$$

$$3x^2 + 18x + 4x + 24 = 0$$

$$\text{Gives } x = -4/3, -6$$

$$3y^2 - 8y - 16 = 0$$

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

$$\text{So } y = -4/3, 4$$

Plot on number line

$$-6 \dots -4/3 \dots 4$$

S43. If $x \leq y$

$$x^2 - 652 = 504$$

$$x^2 = 1156$$

$$\text{So } x = 34, -34$$

$$y = \sqrt{1156} = 34$$

Plot on number line

$$-34 \dots 34$$

S44. If $x < y$

$$9/\sqrt{x} + 8/(\sqrt{x} + 1) = 5$$

$$[9(\sqrt{x} + 1) + 8\sqrt{x}]/[\sqrt{x} * (\sqrt{x} + 1)] = 5$$

$$17\sqrt{x} + 9 = 5(x + \sqrt{x})$$

$$5x - 12\sqrt{x} - 9 = 0$$

$$5x - 15\sqrt{x} + 3\sqrt{x} - 9 = 0$$

$$5\sqrt{x}(\sqrt{x} - 3) + 3(\sqrt{x} - 3) = 0$$

$$\sqrt{x} \text{ cannot be } -3/3$$

$$\text{So } \sqrt{x} = 3, \text{ so } x = 9$$

$$12/\sqrt{y} - 4/\sqrt{y} = 2$$

$$8/\sqrt{y} = 2$$

$$\text{So } \sqrt{y} = 4 \text{ or } y = 16$$

$$\text{So } y > x$$



S45. If $x = y$ or relation cannot be established

$$3x^2 - 6x - \sqrt{3}x + 2\sqrt{3} = 0$$

$$3x(x-2) - \sqrt{3}(x-2) = 0,$$

So $x = 2, \sqrt{3}/3$

$$2y^2 - 3y - 2\sqrt{2}y + 3\sqrt{2} = 0$$

$$y(2y-3) - \sqrt{2}(2y-3) = 0$$

So $y = 3/2, \sqrt{2}$ (1.44)

put on number line
 $\sqrt{3}/3(0.57).....\sqrt{2}.....(3/2).....2$

S46. $x \leq y$

$$3x^2 + 2x - 21 = 0$$

$$3x^2 + 9x - 7x - 21 = 0$$

Gives $x = -3, 7/3$

$$3y^2 - 19y + 28 = 0$$

$$3y^2 - 12y - 7y + 28 = 0$$

So $y = 7/3, 4$

Put on number line
 $-3.....7/3.....4$

S47. If $x \geq y$

$$16x^2 + 8x - 15 = 0$$

$$16x^2 + 20x - 12x - 15 = 0$$

Gives $x = -5/4, 3/4$

$$4y^2 + 29y + 30 = 0$$

$$4y^2 + 24y + 5y + 30 = 0$$

Gives $y = -6, -5/4$

S48. $x = y$ or relationship cannot be determined

$$2x^2 - 6x - \sqrt{3}x + 3\sqrt{3} = 0$$

$$2x(x-3) - \sqrt{3}(x-3) = 0,$$

So $x = 3, \sqrt{3}/2$ (0.7)

$$3y^2 - 9y - \sqrt{3}y + 3\sqrt{3} = 0$$

$$3y(y-3) - \sqrt{3}(y-3) = 0$$

So $x = 3, \sqrt{3}/3$ (0.6)

S49. If $x \leq y$

$$12x^2 - 5x - 3 = 0$$

$$12x^2 + 4x - 9x - 3 = 0$$

Gives $x = -1/3, 3/4$

$$4y^2 - 11y + 6 = 0$$

$$4y^2 - 8y - 3y + 6 = 0$$

Gives $y = 3/4, 2$

S50. If $x > y$

$$2x^2 - 15\sqrt{3}x + 84 = 0$$

Now multiply 2 and $84 = 168$
 we have $\sqrt{3}$ in equation, so divide, $168/3 = 56$

Now make factors so as by multiply you get 56, and by addition or subtraction you get -15
 we have factors (-8) and (-7)
 So $2x^2 - 15\sqrt{3}x + 84 = 0$
 gives
 $2x^2 - 8\sqrt{3}x - 7\sqrt{3}x + 84 = 0$
 $2x(x-4\sqrt{3}) - 7\sqrt{3}(x-4\sqrt{3}) = 0$
 So $x = 3.5\sqrt{3}, 4\sqrt{3}$

$$3y^2 - 2y - 8 = 0$$

$$3y^2 - 6y + 4y - 8 = 0$$

So $y = -4/3, 1$

Plot on number line
 $-4/3.....1..... 3.5\sqrt{3}..... 4\sqrt{3}$

S51. If $x = y$ or relation cannot be established

$$12x^2 - 49x + 30 = 0$$

$$12x^2 - 9x - 40x + 30 = 0$$

Gives $x = 3/4, 10/3$

$$6y^2 - 35y + 50 = 0$$

$$6y^2 - 15y - 20y + 50 = 0$$

Gives $y = 5/2, 10/3$

S52. If $x = y$ or relation cannot be established

$$12x^2 - 5x - 3 = 0$$

$$12x^2 + 4x - 9x - 3 = 0$$

Gives $x = -1/3, 3/4$

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

$$6y^2 - 3y + 4y - 2 = 0$$

Gives $y = -2/3, \frac{1}{2}$

S53. If $x > y$

$$5x^2 - 36x - 32 = 0$$

$$5x^2 + 4x - 40x - 32 = 0$$

Gives $x = -4/5, 8$

$$3y^2 + 16y + 20 = 0$$

$$3y^2 + 6y + 10y + 20 = 0$$

Gives $y = -10/3, -2$

S54. If $x \leq y$

$$2x^2 + (4 + 2\sqrt{6})x + 4\sqrt{6} = 0$$

$$(2x^2 + 4x) + (2\sqrt{6}x + 4\sqrt{6}) = 0$$

$$2x(x+2) + 2\sqrt{6}(x+2) = 0$$

So $x = -2, -\sqrt{6}$

$$5y^2 + (10 + \sqrt{6})y + 2\sqrt{6} = 0$$

$$(5y^2 + 10y) + (\sqrt{6}y + 2\sqrt{6}) = 0$$

$$5y(y+2) + \sqrt{6}(y+2) = 0$$

So, $y = -2, -\sqrt{6}/5$

S55. If $x \geq y$

$$3x^2 - 25x + 52 = 0$$

$$3x^2 - 12x - 13x + 52 = 0$$

Gives $x = 4, 13/3$

$$3y^2 - 16y + 16 = 0$$

$$3y^2 - 14y - 4y + 16 = 0$$

Gives $y = 4, 4/3$

S56. If $x \leq y$

$$2x^2 - 9x + 4 = 0$$

$$2x^2 - 8x - x + 4 = 0$$

So $x = 4, 1/2$

$$2y^2 - 17y + 36 = 0$$

$$2y^2 - 8y - 9y + 36 = 0$$

Gives $y = 4, 9/2$

S57. If $x < y$

$$3x^2 + 7x - 6 = 0$$

$$3x^2 + 9x - 2x - 6 = 0$$

Gives $x = -3, 2/3$

$$3y^2 - 19y + 20 = 0$$

$$3y^2 - 15y - 4y + 20 = 0$$

Gives $y = 4/3, 5$

S58. $x = y$ or relation cannot be established

$$4x^2 - 12x + 5 = 0$$

$$4x^2 - 2x - 10x + 5 = 0$$

$x = 1/2, 5/2$

$$2y^2 + 3y - 20 = 0$$



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

$$\text{So } y = -3, 5/2$$

S59. If $x = y$ or relation cannot be established

$$3x^2 + (3 + 2\sqrt{2})x + 3\sqrt{2} = 0$$

$$(3x^2 + 3x) + (2\sqrt{2}x + 2\sqrt{2}) = 0$$

$$3x(x + 1) + 2\sqrt{2}(x + 1) = 0$$

$$\text{So } x = -1, -2\sqrt{2}/3$$

$$5y^2 + (2 + 5\sqrt{2})y + 2\sqrt{2} = 0$$

$$(5y^2 + 2y) + (5\sqrt{2}y + 2\sqrt{2}) = 0$$

$$y(5y + 2) + \sqrt{2}(5y + 2) = 0$$

$$\text{So, } y = -2/5, -\sqrt{2}$$

S60. $x \geq y$

$$7x^2 + 19x - 6 = 0$$

$$7x^2 + 21x - 2x - 6 = 0$$

$$\text{Gives } x = -3, 2/7$$

$$2y^2 + 13y + 21 = 0$$

$$2y^2 + 6y + 7y + 21 = 0$$

$$\text{So } y = -7/2, -3$$



- Q61.
I. $3x^2 - 8x - 16 = 0$,
II. $3y^2 - 26y + 56 = 0$
- Q62.
I. $3x^2 + 7x - 6 = 0$,
II. $4y^2 - 11y + 6 = 0$
- Q63.
I. $7x^2 + 19x - 6 = 0$,
II. $3y^2 - 8y - 16 = 0$
- Q64.
I. $6x^2 - (3 + 4\sqrt{3})x + 2\sqrt{3} = 0$,
II. $y^2 - (3 + \sqrt{3})y + 3\sqrt{3} = 0$
- Q65.
I. $2x^2 - 13x + 20 = 0$,
II. $3y^2 + 4y - 20 = 0$
- Q66.
I. $3x^2 - 2x - 21 = 0$,
II. $3y^2 + 19y + 28 = 0$
- Q67.
I. $3x^2 + x - 2 = 0$,
II. $4y^2 + 13y + 10 = 0$
- Q68.
I. $3x^2 - 22x + 35 = 0$,
II. $3y^2 - 16y + 21 = 0$
- Q69.
I. $3x^2 - 2x - 21 = 0$,
II. $6y^2 + 17y + 7 = 0$
- Q70.
I. $3x^2 - 2x - 16 = 0$,
II. $3y^2 - 20y + 32 = 0$
- Q71.
I. $3x^2 + 2x - 16 = 0$,
II. $y^2 + 11y + 24 = 0$
- Q72.
I. $4x^2 + 23x + 15 = 0$,
II. $3y^2 - 19y - 14 = 0$
- Q73.
I. $3x^2 + 17x + 24 = 0$,
II. $3y^2 - 4y - 32 = 0$
- Q74.
I. $2x^2 + 5x - 12 = 0$,
II. $4y^2 - 19y - 30 = 0$
- Q75.
I. $2x^2 - 17x + 36 = 0$,
II. $3y^2 - 2y - 8 = 0$
- Q76.
I. $3x^2 + x - 10 = 0$,
II. $2y^2 + 11y + 14 = 0$
- Q77.
I. $2x^2 - x - 36 = 0$,
II. $2y^2 - 21y + 54 = 0$
- Q78.
I. $2x^2 + 7x - 4 = 0$,
II. $3y^2 - 19y + 20 = 0$
- Q79.
I. $3x^2 - x - 10 = 0$,
II. $3y^2 - 11y + 6 = 0$
- Q80.
I. $8x^2 + (4 + 2\sqrt{2})x + \sqrt{2} = 0$
II. $y^2 - (3 + \sqrt{3})y + 3\sqrt{3} = 0$
- Q81.
I. $7x + 3y = 26$
II. $2x + 17y = -41$
- Q82.
I. $35x^2 - 53x + 20 = 0$
II. $56y^2 - 97y + 42 = 0$
- Q83.
I. $x = 3\sqrt{4913}$
II. $13y + 3x = 246$
- Q84.
I. $x^2 = 64$
II. $2y^2 + 25y + 72 = 0$
- Q85.
I. $x^2 - 3481 = 0$
II. $3y^2 = 3\sqrt{216000}$
- Q86.
I. $\sqrt{x} - \sqrt{6} / \sqrt{x} = 0$
II. $y^3 - 6^{3/2} = 0$
- Q87.
I. $3x^2 - 17x + 24 = 0$
II. $4y^2 - 15y + 14 = 0$
- Q88.
I. $x^2 - 2x - \sqrt{5}x + 2\sqrt{5} = 0$
II. $y^2 - \sqrt{3}y - \sqrt{2}y + \sqrt{6} = 0$
- Q89.
I. $6x^2 + 5x - 6 = 0$,
II. $3y^2 - 11y + 6 = 0$
- Q90.
I. $3x^2 - 5x - 12 = 0$,
II. $2y^2 - 17y + 36 = 0$



S61. If $x \leq y$
 $3x^2 - 8x - 16 = 0$
 $3x^2 - 12x + 4x - 16 = 0$
 Gives $x = -4/3, 4$
 $3y^2 - 26y + 56 = 0$
 $3y^2 - 26y + 56 = 0$
 Gives $y = 4, 14/3$

S62. If $x < y$
 $3x^2 + 7x - 6 = 0$
 $3x^2 + 9x - 2x - 6 = 0$
 Gives $x = -3, 2/3$
 $4y^2 - 11y + 6 = 0$
 $4y^2 - 8y - 3y + 6 = 0$
 Gives $y = 3/4, 2$

S63. $x = y$ or relationship cannot be determined
 $7x^2 + 19x - 6 = 0$
 $7x^2 + 21x - 2x - 6 = 0$
 Gives $x = -3, 2/7$
 $3y^2 - 8y - 16 = 0$
 $3y^2 - 12y + 4y - 16 = 0$
 So $y = -4/3, 4$

S64. $x < y$
 $6x^2 - (3 + 4\sqrt{3})x + 2\sqrt{3} = 0$
 $(6x^2 - 3x) - (4\sqrt{3}x - 2\sqrt{3}) = 0$
 $3x(2x - 1) - 2\sqrt{3}(x - 2) = 0,$
 So $x = 1/2, 2\sqrt{3}/3$ (1.15)
 $y^2 - (3 + \sqrt{3})y + 3\sqrt{3} = 0$
 $(y^2 - 3y) - (\sqrt{3}y - 3\sqrt{3}) = 0$
 $y(y - 3) - \sqrt{3}(y - 3) = 0$
 So $x = 3, \sqrt{3}$ (1.73)

S65. If $x > y$
 $2x^2 - 13x + 20 = 0$
 $2x^2 - 8x - 5x + 20 = 0$
 Gives $x = 5/2, 4$
 $3y^2 + 4y - 20 = 0$
 $3y^2 - 6y + 10y - 20 = 0$
 Gives $y = 2, -10/3$

S66. If $x \geq y$

$3x^2 - 2x - 21 = 0$
 $3x^2 - 9x + 7x - 21 = 0$
 Gives $x = -7/3, 3$
 $3y^2 + 19y + 28 = 0$
 $3y^2 + 12y + 7y + 28 = 0$
 Gives $y = -7/3, -4$

S67. $x > y$
 $3x^2 + x - 2 = 0$
 $3x^2 + 3x - 2x - 2 = 0$
 Gives $x = -1/3, 2$
 $4y^2 + 13y + 10 = 0$
 $4y^2 + 8y + 5y + 10 = 0$
 So $y = -2, -5/4$

S68. $x = y$ or relationship cannot be determined
 $3x^2 - 22x + 35 = 0$
 $3x^2 - 15x - 7x + 35 = 0$
 Gives $x = 7/3, 5$
 $3y^2 - 16y + 21 = 0$
 $3y^2 - 9y - 7y + 21 = 0$
 So $y = 7/3, 3$

S69. If $x = y$ or relation cannot be established
 $3x^2 - 2x - 21 = 0$
 $3x^2 - 9x + 7x - 21 = 0$
 Gives $x = -7/3, 3$
 $6y^2 + 17y + 7 = 0$
 $6y^2 + 3y + 14y + 7 = 0$
 Gives $y = -7/3, -1/2$

S70. If $x \leq y$
 $3x^2 - 2x - 16 = 0$
 $3x^2 - 6x - 8x - 16 = 0$
 Gives $x = -2, 8/3$
 $3y^2 - 20y + 32 = 0$
 $3y^2 - 12y - 8y + 32 = 0$
 Gives $y = 8/3, 4$

S71. $x > y$
 $3x^2 + 2x - 16 = 0$
 $3x^2 - 6x + 8x - 16 = 0$

Gives $x = -8/3, 2$
 $y^2 + 11y + 24 = 0$
 $y^2 + 8y + 3y + 24 = 0$
 So, $y = -8, -3$

S72. $x < y$
 $4x^2 + 23x + 15 = 0$
 $4x^2 + 20x + 3x + 15 = 0$
 Gives $x = -5, -3/4$
 $3y^2 - 19y - 14 = 0$
 $3y^2 - 21y + 2y - 14 = 0$
 So $y = -2/3, 7$

S73. If $x \leq y$
 $3x^2 + 17x + 24 = 0$
 $3x^2 + 17x + 24 = 0$
 Gives $x = -3, -8/3$
 $3y^2 - 4y - 32 = 0$
 $3y^2 - 12y + 8y - 32 = 0$
 Gives $y = -8/3, 4$

S74. If $x = y$ or relation cannot be established
 $2x^2 + 5x - 12 = 0$
 $2x^2 + 8x - 3x - 12 = 0$
 Gives $x = -4, 3/2$
 $4y^2 - 19y - 30 = 0$
 $4y^2 - 24y + 5y - 30 = 0$
 Gives $y = -5/4, 6$

S75. If $x > y$
 $2x^2 - 17x + 36 = 0$
 $2x^2 - 8x - 9x + 36 = 0$
 Gives $x = 4, 9/2$
 $3y^2 - 2y - 8 = 0$
 $3y^2 - 6y + 4y - 8 = 0$
 Gives $y = -4/3, 2$

S76. $x \geq y$
 $3x^2 + x - 10 = 0$
 $3x^2 + 6x - 5x - 10 = 0$
 Gives $x = -2, 5/3$
 $2y^2 + 11y + 14 = 0$
 $2y^2 + 4y + 7y + 14 = 0$
 So $y = -7/2, -2$



S77. $x \leq y$

$$2x^2 - x - 36 = 0$$

$$2x^2 + 8x - 9x - 36 = 0$$

$$\text{Gives } x = -4, 9/2$$

$$2y^2 - 21y + 54 = 0$$

$$2y^2 - 12y - 9y + 54 = 0$$

$$\text{So } y = 9/2, 6$$

S78. If $x < y$

$$2x^2 + 7x - 4 = 0$$

$$\text{Gives } x = -4, 1/2$$

$$3y^2 - 19y + 20 = 0$$

$$\text{Gives } y = 4/3, 5$$

S79. If $x = y$ or relation cannot be established

$$3x^2 - x - 10 = 0$$

$$\text{Gives } x = -5/3, 2$$

$$3y^2 - 11y + 6 = 0$$

$$\text{Gives } y = 2/3, 3$$

S80. If $x < y$

$$8x^2 + (4 + 2\sqrt{2})x + \sqrt{2} = 0$$

$$(8x^2 + 4x) + (2\sqrt{2}x + \sqrt{2}) = 0$$

$$4x(2x + 1) + \sqrt{2}(2x + 1) = 0$$

$$\text{So } x = -1/2 (-0.5), -\sqrt{2}/4 (-0.35)$$

$$y^2 - (3 + \sqrt{3})y + 3\sqrt{3} = 0$$

$$(y^2 - 3y) - (\sqrt{3}y - 3\sqrt{3}) = 0$$

$$y(y - 3) - \sqrt{3}(y - 3) = 0$$

$$\text{So } y = 3, \sqrt{3} (1.73)$$

S81. If $x > y$

$$\text{Eqn (I)} \times 2$$

$$\text{Eqn (II)} \times 7$$

$$14x + 6y = 52$$

$$14x + 119y = -287$$

$$-113y = 339$$

$$y = -3 \text{ and } x = 5, \text{ ie } x > y$$

S82. If $x < y$

$$\text{I. } 35x^2 - 28x - 25x + 20 = 0$$

$$\text{or } 7x(5x - 4) - 5(5x - 4) = 0$$

$$\text{or } (7x - 5)(5x - 4) = 0$$

$$x = 5/7, 4/5$$

$$\text{II. } 56y^2 - 48y - 49y + 42 = 0$$

$$\text{or } 8y(7y - 6) - 7(7y - 6) = 0$$

$$\text{or } (8y - 7)(7y - 6) = 0$$

$$y = 7/8, 6/7$$

S83. If $x > y$

$$\text{I. } x = 3\sqrt{4913}$$

$$x = 17$$

$$\text{II. } 13y = 246 - 3x$$

$$\text{or } 13y = 246 - 51 = 195$$

$$y = 15$$

S84. $x = y$ or relation cannot be established

$$\text{I. } x^2 = 64$$

$$x = \pm 8$$

$$\text{II. } 2y^2 + 9y + 16y + 72 = 0$$

$$\text{or, } y(2y + 9) + 8(2y + 9) = 0$$

$$\text{or, } (y + 8)(2y + 9) = 0$$

$$y = -8, -9/2$$

no relation between x and y .

S85. If $x = y$ or relation cannot be established

$$\text{I. } x^2 = 3481$$

$$x = \pm 59$$

$$\text{II. } 3y^2 = 3\sqrt{216000}$$

$$3y^2 = 60$$

$$y = \pm \sqrt{20}$$

No relation

S86. If $x = y$ or relation cannot be established

$$\sqrt{x} - \sqrt{6} / \sqrt{x} = 0$$

$$x - \sqrt{6} = 0$$

$$x = \sqrt{6}$$

$$y^3 - 6(3/2) = 0$$

$$\Rightarrow y^3 = (\sqrt{6})^3$$

$$\Rightarrow y = \sqrt{6}$$

S87. If $x > y$

$$3x^2 - 17x + 24 = 0$$

$$\Rightarrow 3x^2 - 9x - 8x + 24 = 0$$

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

$$\Rightarrow x = 8/3 \text{ or } 3$$

$$4y^2 - 15y + 14 = 0$$

$$\Rightarrow 4y^2 - 8y - 7y + 14 = 0$$

$$\Rightarrow (4y - 7)(y - 2) = 0$$

$$\Rightarrow y = 7/4 \text{ or } 2$$

S88. If $x > y$

$$x^2 - 2x - \sqrt{5}x + 2\sqrt{5} = 0$$

$$\Rightarrow x(x - 2) - \sqrt{5}(x - 2) = 0$$

$$\Rightarrow (x - 2)(x - \sqrt{5}) = 0$$

$$\Rightarrow x = 2 \text{ or } \sqrt{5}$$

$$y^2 - \sqrt{3}y - \sqrt{2}y + \sqrt{6} = 0$$

$$\Rightarrow y(y - \sqrt{3}) - \sqrt{2}(y - \sqrt{3}) = 0$$

$$\Rightarrow (y - \sqrt{2})(y - \sqrt{3}) = 0$$

$$\Rightarrow y = \sqrt{2} \text{ or } \sqrt{3}$$

S89. If $x \leq y$

$$x = 2/3, 3$$

$$y = -3/2, 2/3$$

S90. If $x < y$

$$x = -4/3, 3$$

$$y = 4, 9/2$$



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freely at
aspirantszone@gmail.com