

Solve equations, number 1 to number 20, given below, using factorisation method :

1.  $x^2 - 10x - 24 = 0$
2.  $x^2 - 16 = 0$
3.  $2x^2 - \frac{1}{2}x = 0$
4.  $x(x - 5) = 24$
5.  $\frac{9}{2}x = 5 + x^2$
6.  $\frac{6}{x} = 1 + x$
7.  $x = \frac{3x + 1}{4x}$
8.  $x + \frac{1}{x} = 2.5$
9.  $(2x - 3)^2 = 49$
10.  $2(x^2 - 6) = 3(x - 4)$
11.  $(x + 1)(2x + 8) = (x + 7)(x + 3)$
12.  $x^2 - (a + b)x + ab = 0$
13.  $(x + 3)^2 - 4(x + 3) - 5 = 0$
14.  $4(2x - 3)^2 - (2x - 3) - 14 = 0$
15.  $\frac{3x - 2}{2x - 3} = \frac{3x - 8}{x + 4}$

16.  $2x^2 - 9x + 10 = 0$ , when :

- (i)  $x \in \mathbb{N}$       (ii)  $x \in \mathbb{Q}$ .

17.  $\frac{x-3}{x+3} + \frac{x+3}{x-3} = 2 \frac{1}{2}$

18.  $\frac{4}{x+2} - \frac{1}{x+3} = \frac{4}{2x+1}$

19.  $\frac{5}{x-2} - \frac{3}{x+6} = \frac{4}{x}$

20.  $\left(1 + \frac{1}{x+1}\right) \left(1 - \frac{1}{x-1}\right) = \frac{7}{8}$

21. Find the quadratic equation, whose solution set is :

- (i) {3, 5}      (ii) {-2, 3}

22. (i) Solve :  $\frac{x}{3} + \frac{3}{6-x} = \frac{2(6+x)}{15}$ ; ( $x \neq 6$ )

(ii) Solve the equation  $9x^2 + \frac{3x}{4} + 2 = 0$ , if possible, for real values of  $x$ .

23. Find the value of  $x$ , if  $a + 1 = 0$  and  $x^2 + ax - 6 = 0$ .
24. Find the value of  $x$ , if  $a + 7 = 0$ ;  $b + 10 = 0$  and  $12x^2 = ax - b$ .
25. Use the substitution  $y = 2x + 3$  to solve for  $x$ , if  $4(2x + 3)^2 - (2x + 3) - 14 = 0$ .
26. Without solving the quadratic equation  $6x^2 - x - 2 = 0$ , find whether  $x = \frac{2}{3}$  is a solution of this equation or not.
27. Determine whether  $x = -1$  is a root of the equation  $x^2 - 3x + 2 = 0$  or not.
28. If  $x = \frac{2}{3}$  is a solution of the quadratic equation  $7x^2 + mx - 3 = 0$ ; find the value of  $m$ .
29. If  $x = -3$  and  $x = \frac{2}{3}$  are solutions of quadratic equation  $mx^2 + 7x + n = 0$ , find the values of  $m$  and  $n$ .
30. If quadratic equation  $x^2 - (m + 1)x + 6 = 0$  has one root as  $x = 3$ ; find the value of  $m$  and the other root of the equation.
31. Given that 2 is a root of the equation  $3x^2 - p(x + 1) = 0$  and that the equation  $px^2 - qx + 9 = 0$  has equal roots, find the values of  $p$  and  $q$ .
32. If  $x \neq 0$  and  $a \neq 0$ , solve :
- $$\frac{x}{a} - \frac{a+b}{x} = \frac{b(a+b)}{ax}.$$
33. Solve :  $\left(\frac{1200}{x} + 2\right)(x - 10) - 1200 = 60$ .
34. If -1 and 3 are the roots of  $x^2 + px + q = 0$ , find the values of  $p$  and  $q$ .

1. Solve, each of the following equations, using the formula :

$$(i) x^2 - 6x = 27$$

$$(ii) x^2 - 10x + 21 = 0$$

$$(iii) x^2 + 6x - 10 = 0$$

$$(iv) x^2 + 2x - 6 = 0$$

$$(v) 3x^2 + 2x - 1 = 0$$

$$(vi) 2x^2 + 7x + 5 = 0$$

$$(vii) \frac{2}{3}x = -\frac{1}{6}x^2 - \frac{1}{3}$$

$$(viii) \frac{1}{15}x^2 + \frac{5}{3} = \frac{2}{3}x$$

$$(ix) x^2 - 6 = 2\sqrt{2}x$$

$$(x) \frac{4}{x} - 3 = \frac{5}{2x+3}$$

$$(xi) \frac{2x+3}{x+3} = \frac{x+4}{x+2}$$

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

$$(xiii) \frac{2x}{x-4} + \frac{2x-5}{x-3} = 8\frac{1}{3}$$

$$(xiv) \frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$$

2. Solve each of the following equations for  $x$  and give, in each case, your answer correct to one decimal place :

$$(i) x^2 - 8x + 5 = 0$$

$$(ii) 5x^2 + 10x - 3 = 0$$

3. Solve each of the following equations for  $x$  and give, in each case, your answer correct to 2 decimal places :

$$(i) 2x^2 - 10x + 5 = 0$$

$$(ii) 4x + \frac{6}{x} + 13 = 0$$

$$(iii) 4x^2 - 5x - 3 = 0$$

$$(iv) x^2 - 3x - 9 = 0$$

$$(v) x^2 - 5x - 10 = 0$$

[2017]

[2007]

[2013]

4. Solve each of the following equations for  $x$ , giving your answer correct to 3 decimal places:

$$(i) 3x^2 - 12x - 1 = 0$$

$$(ii) x^2 - 16x + 6 = 0$$

$$(iii) 2x^2 + 11x + 4 = 0$$

5. Solve :

$$(i) x^4 - 2x^2 - 3 = 0 \quad (ii) x^4 - 10x^2 + 9 = 0$$

6. Solve :

$$(i) (x^2 - x)^2 + 5(x^2 - x) + 4 = 0$$

$$(ii) (x^2 - 3x)^2 - 16(x^2 - 3x) - 36 = 0$$

7. Solve :

$$(i) \sqrt{\frac{x}{x-3}} + \sqrt{\frac{x-3}{x}} = \frac{5}{2}$$

$$(ii) \left(\frac{2x-3}{x-1}\right) - 4\left(\frac{x-1}{2x-3}\right) = 3$$

$$(iii) \left(\frac{3x+1}{x+1}\right) + \left(\frac{x+1}{3x+1}\right) = \frac{5}{2}$$

8. Solve the equation  $2x - \frac{1}{x} = 7$ . Write your answer correct to two decimal places. [2006]

9. Solve the following equation and give your answer correct to 3 significant figures :  $5x^2 - 3x - 4 = 0$  [2012]

10. Solve for  $x$  using the quadratic formula. Write your answer correct to two significant figures.  $(x-1)^2 - 3x + 4 = 0$ . [2014]

11. Solve the given quadratic equation,  $x^2 - 3(x+3) = 0$ ; giving your answer correct to two significant figures. [2016]

Solve each of the following equations :

$$1. \frac{2x}{x-3} + \frac{1}{2x+3} + \frac{3x+9}{(x-3)(2x+3)} = 0;$$

$$x \neq 3, x \neq -\frac{3}{2}$$

$$2. (2x+3)^2 = 81$$

$$3. a^2x^2 - b^2 = 0$$

$$4. x^2 - \frac{11}{4}x + \frac{15}{8} = 0$$

$$5. x + \frac{4}{x} = -4; x \neq 0$$

$$6. 2x^4 - 5x^2 + 3 = 0 \quad \text{Take } x^2 = y$$

$$7. x^4 - 2x^2 - 3 = 0$$

$$8. 9(x^2 + \frac{1}{x^2}) - 9(x + \frac{1}{x}) - 52 = 0$$

$$\text{Let } x + \frac{1}{x} = y \Rightarrow x^2 + \frac{1}{x^2} + 2 = y^2$$

$$\Rightarrow x^2 + \frac{1}{x^2} = y^2 - 2.$$

$\therefore$  Given equation reduces to :

$$9(y^2 - 2) - 9y - 52 = 0$$

$$\text{i.e. } 9y^2 - 9y - 70 = 0$$

$$\Rightarrow (3y - 10)(3y + 7) = 0$$

$$\Rightarrow y = \frac{10}{3}, \text{ or } y = -\frac{7}{3}.$$

$$y = \frac{10}{3} \Rightarrow x + \frac{1}{x} = \frac{10}{3},$$

$$\text{solve it to get } x = 3, \text{ or } \frac{1}{3}.$$

$$\text{Similarly } y = -\frac{7}{3} \Rightarrow x + \frac{1}{x} = -\frac{7}{3},$$

$$\text{solve it to get } x = \frac{-7 \pm \sqrt{13}}{6}.$$

$$\therefore \text{The solution is } 3, \frac{1}{3}, \frac{-7 \pm \sqrt{13}}{6}$$

$$9. 2(x^2 + \frac{1}{x^2}) - (x + \frac{1}{x}) = 11$$

$$10. (x^2 + \frac{1}{x^2}) - 3(x - \frac{1}{x}) - 2 = 0$$

$$\text{Let } x - \frac{1}{x} = y \Rightarrow x^2 + \frac{1}{x^2} = y^2 + 2$$

$$11. (x^2 + 5x + 4)(x^2 + 5x + 6) = 120$$

$$\text{Take } x^2 + 5x = y$$