



# MATHS

## BOOKS - NAND LAL PUBLICATION

### QUADRATIC EQUATIONS

#### Exercise 4 1

1. Check whether the following are quadriatic equations :

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



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2. Check whether the following are quadratic equations :

$$x^2 - 2x = (-2)(3 - x)$$



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3. Check whether the following are quadratic equations :

$$(x - 2)(x + 1) = (x - 1)(x + 3)$$



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4. Check whether the following are quadratic equations :

$$(x - 3)(2x + 1) = x(x + 5)$$



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5. Check whether the following are quadratic equations :

$$(2x - 1)(x - 3) = (x + 5)(x - 1)$$



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6. Check whether the following are quadratic equations :

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



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7. Check whether the following are quadratic equations :

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



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8. Check whether the following are quadratic equations :

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



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## Exercise 4 2

1. Find the roots of the following quadratic equations by factorisation :

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



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2. Find the roots of the following quadratic equations by factorisation :

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



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3. Find the roots of the following quadratic equations by factorisation :

$$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$$



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4. Find the roots of the following quadratic equations by factorisation :

$$2x^2 - x + \frac{1}{8} = 0$$



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5. Find the roots of the following quadratic equations by factorisation :

$$100x^2 - 20x + 1 = 0$$



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**6.** Solve the problems given in Example 1 i.e .,  
to solve

$x^2 - 45x + 324 = 0$  using factorisation  
method .



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7. Solve the problems given in Example 1 i.e to solve

$x^2 - 55x + 750 = 0$  using factorisation method .



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8. Find two numbers whose sum is 27 and product is 182.



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9. The altitude of a right triangle is 7 cm less than its base. If the hypotenuse is 13 cm, find the other two sides.



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### Exercise 4 3

1. Find the roots of the following quadratic equations if they exist, by the method of completing the square :  $2x^2 - 7x + 3 = 0$ .



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2. Find the roots of the following quadratic equations if they exist, by the method of completing the square :  $2x^2 + x - 4 = 0$  .



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3. Find the roots of the following quadratic equations if they exist, by the method of completing the square :  $4x^2 + 4\sqrt{3}x + 3 = 0$  .



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4. Find the roots of the following quadratic equations if they exist, by the method of completing the square :  $2x^2 + x + 4 = 0$  .



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5. Find the roots of the following equations :-

$$x - \frac{1}{x} = 3, x \neq 0 .$$



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6. Find the roots of the following equations :-

$$\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq -4, 7.$$



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7. The sum of the reciprocals of Rehman's ages, (in years) 3 years ago and 5 years from now is  $\frac{1}{3}$ . Find his present age.



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8. The diagonal of a rectangular field is 60 metres more than the shorter side. If the longer side is 30 metres more than the shorter side, find the sides of the field.



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9. The difference of squares of two numbers is 180. The square of the smaller number is 8 times the larger number. Find the two numbers.



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**10.** A train travels 360 km at a uniform speed. If the speed had been 5 km/h more, it would have taken 1 hour less for the same journey. Find the speed of the train.



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**11.** Two water taps together can fill a tank in  $9\frac{3}{8}$  hours. The tap of larger diameter takes 10 hours less than the smaller one to fill the tank

separately. Find the time in which each tap can separately fill the tank.



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## Exercise 4 4

1. Find the nature of the roots of the following quadratic equations. If the real roots exist, find them :-  $2x^2 - 3x + 5 = 0$ .



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2. Find the nature of the roots of the following quadratic equations. If the real roots exist, find them :-  $3x^2 - 4\sqrt{3}x + 4 = 0$ .



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3. Find the nature of the roots of the following quadratic equations. If the real roots exist, find them :-  $2x^2 - 6x + 3 = 0$ .



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4. Find the values of  $k$  for each of the following quadratic equations, so that they have two equal roots. :-  $2x^2 + kx + 3 = 0$  .



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5. Find the values of  $k$  for each of the following quadratic equations, so that they have two equal roots. :-  $kx(x-2)+6=0$  .



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6. Is it possible to design a rectangular mango grove whose length is twice its breadth, and the area is  $800 \text{ m}^2$  ? If so, find its length and breadth.



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7. Is the following situation possible ? If so, determine their present ages. The sum of the ages of two friends is 20 years. Four years ago, the product of their ages in years was 48.





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8. Is it possible to design a rectangular park of perimeter 80 m and area  $400 \text{ m}^2$  ? If so, find its length and breadth.



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