EXERCISE 4.1 - Question No. 1

Check whether the following are quadratic equation (i)

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

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

$(x-3)(2x+1) = x(x+5)$ (v) $(2x1)(x3) = (x+5)(x1)$ (vi)

$x^2 + 3x + 1 = (x-2)^2$ (vii) $(x+2)^3 = 2x\left(x^2 - 1\right)$ (viii) `x^3-

EXERCISE 4.1 - Question No. 2

Represent the following situations in the form of quadratic equations : (i) The area of a rectangular plot is 528 m^2 . The length of the plot (in metres) is one more than twice its breadth. We need to find the length and breadth of the plo

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EXERCISE 4.2 - Question No. 1

Find the roots of the following quadratic equations by factorisation:

(i) $x^2 - 3x - 10 = 0$ (ii) $2x^2 - x - 6 = 0$ (iii)

$\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$ (iv) $100x^2 - 20x + 1 = 0$ (v)

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

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EXERCISE 4.2 - Question No. 2

Solve the problems given in Example 1.

EXERCISE 4.2 - Question No. 3

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

EXERCISE 4.2 - Question No. 4

Find two consecutive positive integers, sum of whose squares is 365.

EXERCISE 4.2 - Question No. 5

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

EXERCISE 4.2 - Question No. 6

A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of

production on that day was Rs 90. Find the number of articles produced and the cost of each article.

EXERCISE 4.3 - Question No. 1

Find the roots of the following quadratic equations, if they exist, by the method of completing the square: (i) $2x^2 - 7x + 3 = 0$ (ii) $2x^2 + x - 4 = 0$ (iii) $4x^2 + 4\sqrt{3}x + 3 = 0$ (iv) $2x^2 + x + 4 = 0$

EXERCISE 4.3 - Question No. 2

Find the roots of the quadratic equations by applying the quadratic formula. (i) $2x^2 - 7x + 3 = 0$ (ii) $2x^2 + x - 4 = 0$ (iii) $4x^2 + 4\sqrt{3}x + 3 = 0$ (iv) $2x^2 + x + 4 = 0$

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EXERCISE 4.3 - Question No. 3

Find the roots of the following equations : (i) $x - \frac{1}{x} = 3, x \neq 0$ (ii) $\frac{1}{x+4} - \frac{1}{x-7} = \frac{11}{30}, x \neq -4, 7$

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EXERCISE 4.3 - Question No. 4

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

EXERCISE 4.3 - Question No. 5

In a class test, the sum of Shefalis marks in Mathematics and English is 30. Had she got 2 marks more in Mathematics and 3 marks less in English, the product of their marks would have been 210. Find her marks in the two subjects.

EXERCISE 4.3 - Question No. 6

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.

EXERCISE 4.3 - Question No. 7

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.

EXERCISE 4.3 - Question No. 8

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.

EXERCISE 4.3 - Question No. 9

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.

EXERCISE 4.3 - Question No. 10

An express train takes 1 hour less than a passenger train to travel 132 km between Mysore and Bangalore (without taking into consideration the time they stop at intermediate stations). If the average speed of the express train is 11km h more than that of the passenger train, find the average speed of the two trains.

EXERCISE 4.3 - Question No. 11

Sum of the areas of two squares is 468 m^2 . If the difference of their perimeters is 24 m, find the sides of the two squares.

EXERCISE 4.4 - Question No. 1

Find the nature of the roots of the following quadratic equations. If the real roots exist, find them: (i) $2x^2 - 3x + 5 = 0$ (ii) $3x^2 - 4\sqrt{3}x + 4 = 0$ (iii) $2x^2 - 6x + 3 = 0$

EXERCISE 4.4 - Question No. 2

Find the values of k for each of the following quadratic equations, so that they have two equal roots. (i) $2x^2 + kx + 3 = 0$ (ii) $kx(x - 2) + 6 = 0$

EXERCISE 4.4 - Question No. 3

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

EXERCISE 4.4 - Question No. 4

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.

EXERCISE 4.4 - Question No. 5

Is it possible to design a rectangular park of perimeter 80 m and area 400 m2? If so, find its length and breadth.

SOLVED EXAMPLES - Question No. 1

Represent the following situations mathematically: (i) John and Jivanti together have 45 marbles. Both of them lost 5 marbles each, and the product of the number of marbles they now have is 124. We would like to find out how many marbles they had to start with. (ii) A cottage industry produces a certain number of toys in a day. The

cost of production of each toy (in rupees) was found to be 55 minus the number of toys produced in a day. On a particular day, the total cost of production was Rs 750. We would like to find out the number of toys produced on that day.

SOLVED EXAMPLES - Question No. 2

Check whether the following are quadratic equations : (i) $(x-2)^2+1=2x-3$ (ii) $x(x+1)+8=(x+2)(x2)$ (iii) $x(2x+3)=x^2+1$ (iv) $(x+2)^3=x^3-4$

SOLVED EXAMPLES - Question No. 3

Find the roots of the equation $2x^2 - 5x + 3 = 0$, by factorisation.

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SOLVED EXAMPLES - Question No. 4

Find the roots of the quadratic equation $6x^2 - x - 2 = 0$.

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SOLVED EXAMPLES - Question No. 5

Find the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$

SOLVED EXAMPLES - Question No. 6

Find the dimensions of the prayer hall discussed in Section 4.1.

SOLVED EXAMPLES - Question No. 7

Solve the equation given in Example 3 by the method of completing the square.

SOLVED EXAMPLES - Question No. 8

Find the roots of the equation $5x^2 - 6x - 2 = 0$ by the method of completing the square.

SOLVED EXAMPLES - Question No. 9

Find the roots of $4x^2 + 3x + 5 = 0$ by the method of completing the square.

SOLVED EXAMPLES - Question No. 10

Solve Question 2(i) of Exercise 1 by using the quadratic formula.

SOLVED EXAMPLES - Question No. 11

Find two consecutive odd positive integers, sum of whose squares is 290.

SOLVED EXAMPLES - Question No. 12

A rectangular park is to be designed whose breadth is 3 m less than its length. Its area is to be 4 square metres more than the area of a park that has already been made in the shape of an isosceles

triangle with its base as the breadth of the rectangular park and of altitude 12 m (see Figure). Find its length and breadth.

SOLVED EXAMPLES - Question No. 13

Find the roots of the following quadratic equations, if they exist, using the quadratic formula: (i) $3x^2 - 5x + 2 = 0$ (ii) $x^2 + 4x + 5 = 0$ (iii) $2x^2 - 2\sqrt{2}x + 1 = 0$

SOLVED EXAMPLES - Question No. 14

Find the roots of the following equations : (i) $x + \frac{1}{x} = 3, x \neq 0$

(ii) $\frac{1}{x} - \frac{1}{x-2} = 3, x \neq 0, 2$

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SOLVED EXAMPLES - Question No. 15

A motor boat whose speed is 18 km/h m still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

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SOLVED EXAMPLES - Question No. 16

Find the discriminant of the quadratic equation $2x^2 - 4x + 3 = 0$, and hence find the nature of its roots.

SOLVED EXAMPLES - Question No. 17

A pole has to be erected at a point on the boundary of a circular park of diameter 13 metres in such a way that the differences of its distances from two diametrically opposite fixed gates A and B on the boundary is 7 metres. Is it possible to do so? If yes, at what distances from the two gates should the pole be erected?

SOLVED EXAMPLES - Question No. 18

Find the discriminant of the equation $3x^2 - 2x + \frac{1}{3} = 0$ and hence find the nature of its roots. Find them, if they are real.