RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.5: The academic team here has produced a step-by-step solution for the quadratic equations in Chapter 10 of the RS Aggarwal class 10 textbook. The chapter 10 Quadratic Equations Exercise-10E solution by RS Aggarwal class 10 is uploaded for reference only; do not copy the solutions.

Before proceeding with the solution, make sure you have a firm understanding of the chapter-10 Quadratic Equations. Read the theory of the chapter-10 Quadratic Equations and then attempt to solve all of the numerical problems in exercise-10E. Use Entrancei NCERT Solutions to find answers to questions from the NCERT textbook for maths class 10.

RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.5 Overview

RS Aggarwal's solutions for Class 10 Maths, Chapter 10, Exercise 10.5 on Quadratic Equations offer a comprehensive guide to solving quadratic problems. This exercise typically focuses on solving quadratic equations by various methods, such as factoring, completing the square, and using the quadratic formula. The solutions provide clear, step-by-step instructions for each problem, making it easier for students to understand and apply different techniques.

This practice helps reinforce key concepts, improve problem-solving skills, and prepare for exams by offering a range of practice problems that build confidence and mastery in dealing with quadratic equations.

What are Quadratic Equations?

A polynomial equation of second degree, or one that has at least one squared term, is referred to as a quadratic. Another name for it is quadratic equations. The quadratic equation has the following generic form:

$ax^2 + bx + c = 0$

where a, b, and c are numerical coefficients and x is an unknown variable. An example of a quadratic or quadratic equation is x2 + 2x +1. In this case, a ≠ 0 since if it does, the equation will no longer be quadratic and will instead become linear, as in the following cases:

$bx+c=0$

RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.5

Below we have provided RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.5 for the ease of the students –

Q. The sum of two natural numbers is 28 and their product is 192. Find the numbers.

Solution

Let first no = x

second no = y

x + y = 28x = 28 − y -------------(1)

poduct of number = x × y = 192---------(2)

putting value of x in 2nd

$(28 - y)y = 192$

$28y - y^2 = 192$

$28y - y^2 \cdot 192 = 0$

$y^2 - 28y + 192 = 0$

$y^2 - (16 + 12)y + 192 = 0$

$y^2 - 16y - 12y + 192 = 0$

$y(y - 16) - 12(y - 16) = 0$

$(y - 16)(y - 12)$

$y - 16 = 0$

$y = 16, 12$

when

$y = 16$

then

$x = 28 - y$

$x = 28 - 16 = 12$

when$y=12$

$x = 28 - 12 = 16$

the numbers are 12 and 16

Q. The sum of the squares two consecutive positive integers is 365.Find the integers.

Solution

let the no. be x and x+1

then we have $x^2+(x+1)^2=365$

$2x^2+2x-364=0$

$x^2+x-182=0$

$x^2+14x-13x-182=0$

$(x+14)(x-13)=0$

That gives x=13 and x=-14, Avoiding as a negative value.

One number is 13 and other one 14

Q. The sum of the squares of two consecutive positive odd numbers is 514. Find the numbers.

Solution

Let the two consecutive no. be x &x+2

A.T.Q

$x^2 + (x + 2)^2 = 514$

$x^2 + x^2 + 4 + 4x = 514$

$2x^2 + 4x = 514 - 4$

$2x^2 + 4x = 510$

$2x^2 + 4x - 510$

$x^2 + 2x - 255$

$x^2 + 17x - 15x - 255$

$x(x + 17) - 15(x + 17)$

$(x + 17)(x - 15)$

$x + 17 = 0$

$x = -17$

&

$x - 15 = 0$

$x = 15$

if the odd no. is

$x = -17$ ......
$x + 2 = -17 + 2$
$x = -15$
if the odd no. is

$x = 15x + 2..x = 15 + 2x = 17$

those no. can be -17 or-15

or it can be 15 or 17

Q. The product of two consecutive positive integers is 306. Find the integers.

Solution

Let two consecutive numbers are x and (x + 1)

A/C to question,

product of x and (x + 1) = 306

$\Rightarrow x(x + 1) = 306$

$\Rightarrow x^2 + x - 306 = 0$

$\Rightarrow x^2 + 18x - 17x - 306 = 0$

$\Rightarrow x(x + 18) - 17(x + 18) = 0$

$\Rightarrow (x + 18)(x - 17) = 0 \Rightarrow x = 17$ and -18

Hence, numbers are x = 17 and (x +1) = 18

Q. The sum of two natural numbers is 9 and the sum of their reciprocal is $\frac{1}{2}$. Find the numbers.

Solution

Let one number be x

and other number be 9 − x

sum of their reciprocal = $\frac{1}{2}$

$\frac{1}{x} + \frac{1}{9 - x} = \frac{1}{2}$

$\Rightarrow \frac{9 - x + x}{x(9 - x)} = \frac{1}{2}$

$\Rightarrow \frac{9}{x(9 - x)} = \frac{1}{2}$

$\Rightarrow x(9 - x) = 18$

$\Rightarrow x^2 - 9x + 18 = 0$

$\Rightarrow x^2 - 6x - 3x + 18 = 0$

$\Rightarrow x(x - 6) - 3(x - 6) = 0$

$\Rightarrow (x - 6)(x - 3) = 0$

$\therefore x = 6, 3$

Hence, the numbers are 6 and 3.

Q. The sum of two natural numbers is 3 and the difference of their reciprocals is $\frac{3}{28}$. Find the numbers.

Solution

There are some mistake in question according to me there are difference of two natural number is 3 which solution given below.

Let the nos be X and X+3.

Their reciprocals are

1/x and 1/x + 3

Now 1/x − 1/x − 3 = 3/28

So, $x + 3 - x/x^2 + 3x = 3/28$

$3 * 28 = 3x^2 + 9x$

$84 = 3x^2 + 9x$

$3x^2 + 9x \quad 84 = 0/3$

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

$(x + 7)(x - 4) = 0$

Now

$x = -7$ or $x = +4$

Case-1

$x = -7$

$x + 3 = -7 + 3 = -4$

Now

$-4 - (-7) = -4 + 7 = +3.$

Case-2

$x = +4$

$x + 3 = 4 + 3 = 7$

Now

$7 - 4 = +3$

Therefore the nos are 7 and 4.

Q. The difference of two natural numbers is 5 and the difference of their reciprocals is $\frac{5}{14}$. Find the numbers.

Solution

Let the two natural numbers be x and y

A/q

$y - x = 5$.....(1)

$\frac{1}{x} - \frac{1}{y} = \frac{5}{14}$....(2)

From(1.)

$y = x + 5$

Putting the value of y in eqn. (2)

$\frac{1}{x} - \frac{1}{x+5} = \frac{5}{14}$

=> $\frac{x+5-x}{x(x+5)} = \frac{5}{14}$

=> $\frac{5}{x^2+5x} = \frac{5}{14}$

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

=> $x^2 + (7 - 2)x - 14 = 0$

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

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

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

Either $x + 7 = 0$

=> $x = -7$Not acceptable because -7 is not natural number

Q. The sum of the squares of two consecutive multiples of 7 is 1225. Find the multiples.

Solution

Let the required consecutive multiples of 7 are $7x$ and $7(x + 1)$.

According to the given condition,

$(7x)^2 + [7(x + 1)]^2 = 1225$

$49x^2 + 49(x^2 + 2x + 1) = 1225$

$49x^2 + 49x^2 + 98x + 49 = 1225$

$98x^2 + 98x - 1176 = 0$

$x^2 + x - 12 = 0$

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

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

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

$x + 4 = 0 \text{or} x - 3 = 0$

$x = -4$ or $x = 3$

Therefore, $x = 3$(Neglecting the negative value)

When $x = 3$,

$7x = 7 \times 3 = 21$

$7(x + 1) = 7(3 + 1) = 7 \times 4 = 28$

Hence, the required multiples are 21 and 28.

Q. Divide 57 into two parts whose product is 680.

Solution

57 is divided into two parts.

Let one part = x

Second part = 57 - x

According to the given problem ,

Product of the two numbers = 680

x (57 - x) = 680

$$57x - x^2 = 680$$
$$x^2 - 57x + 680 = 0$$
$$x^2 - 40x - 17x + 680 = 0$$

x (x - 40) - 17 (x - 40) = 0

(x - 40)(x - 17) = 0

Therefore ,

Therefore ,

$x - 40 = 0$ or $x - 17 = 0$

$x = 40$ or $x = 17$

Required two parts are

i) One part = $x = 40$

Second part = $57 - x = 57 - 40 = 17$

Or

One part = $x = 17$

Second part = $57 - 17 = 40$

Q. The difference of the squares of two natural numbers is 45. The square of the smaller number is four times the larger number. Find the numbers.

Solution

Let the smaller natural number be x and larger natural number be y

Hence $x^2 = 4y \rightarrow (1)$

Given $y^2 - x^2 = 45$

$\Rightarrow y^2 - 4y = 45$

$\Rightarrow y^2 - 4y - 45 = 0$

$\Rightarrow y^2 - 9y + 5y - 45 = 0$

$\Rightarrow y(y - 9) + 5(y - 9) = 0$

$\Rightarrow (y - 9)(y + 5) = 0$

$\Rightarrow (y - 9) = 0$ or $(y + 5) = 0$

$\therefore y = 9$ or $y = -5$

But y is natural number, hence $y \neq -5$

Therefore, $y = 9$

Equation (1) becomes,

$x^2 = 4(9) = 36$

$\therefore x = 6$

Thus the two natural numbers are 6 and 9.

Q. A person on tour has Rs.10800 for his expenses. If he extends his tour by 4 days, he has to cut down his daily expenses by Rs.90. Find the original duration of the tour.

Let the original duration of tour be x days

Amount with the person is Rs 10800

Daily expenses = Rs $\frac{10800}{x}$

Given tour extended for 4 more days

Hence total number of days = (x + 4) days

Daily expenses = $\frac{10800}{x+4}$ Rs [10800/(x + 4)]

By the given problem, we have

$\frac{10800}{x} - \frac{10800}{x+4} = 90$

$10800\left(\frac{1}{x} - \frac{1}{x+4}\right) = 90$

$\frac{120(x+4-x)}{(x)(x+4)} = 1$

$480 = x^2 + 4x$

$x^2 + 4x - 480 = 0$

$x^2 + (24 - 20)x - 480 = 0$

$x^2 + 24x - 20x - 480 = 0$

$x(x + 24) - 20(x + 24) = 0$

$(x + 24)(x - 20) = 0$

Hence x = -24 as x cannot be negative

Thus the original duration of tour is 20 days.

Q. The sum of the ages of a boy and his brother is 25 years, and the product of their ages in years is 126. Find their ages.

Solution

Let the age of boy be x and the age of his brother be y

hen

+ y = 25.....(1)

xy = 126.....(2)

hen

$y)^2 = (x + y)^2 - 4xy$

$x - y = \sqrt{(x + y)^2 - 4xy}$

$y = \sqrt{(25)2 - 4 \times 126}$

$x - y = \sqrt{625 - 504}$

$y = \sqrt{121} = 11$

$y = 11$....(3)

om equation (1) and (3)

y = 25....(1)

y = 11.....(3)

Adding them

2x = 36

x = 18

put in equation (1)

18 + y = 25

y = 25 − 18

y = 7

Q. The product of Tanvy's age (in years) 5 years ago and her age 8 years later is 30. Find her present age.

Solution

Let the Tanvy age be x
5 years ago her age is (x-5)
and 8 years latter her age be (x+8)
then

$(x-5)(x+8) = 30$
$x^2 + 8x - 5x - 40 = 30$
$x^2 + 3x - 70 = 0$
$x^2 + (10-7)x - 70 = 0$
$x^2 + 10x - 7x - 70 = 0$
$x(x+10) - 7(x+10) = 0$
$(x+10)(x-7) = 0$
$x + 10 = 0$
$x = -10$
Age can not be negative
$x - 7 = 0$
$x = 7$
Answer :- present age = 7 year old

Q. While boarding an aeroplane, a passenger got hurt, The pilot showing promptness and concern, made arrangements to hospitalise the injured and so the plane started late by 30 minutes. To reach the destination, 1500 km away, in time, the pilot increased the speed by 100 km/hour. Find the original speed of the plane.
Do you appreciate the values shown by the pilot, namely promptness in providing help to the injured and his efforts to reach in time?

Let the Original speed of the aeroplane be x km/h.

Time taken to cover 1500 km with the usual speed of x km/h = 1500 / x hrs

Time taken to cover 1500 km with the increase speed of (x+100) km/h = 1500 / (x+100) hrs

ATQ

$\frac{1500}{x} = \frac{1500}{x+100} + \frac{1}{2}$

$\frac{1500}{x} - \frac{1500}{x+100} = \frac{1}{2}$

$\frac{1500(x+100)-1500x}{x(x+100)} = \frac{1}{2}$

$\frac{1500x+1500\times100-1500x}{x^2+100x} = \frac{1}{2}$

$\frac{1500\times100}{x^2+100x} = \frac{1}{2}$

$2(1500 \times 100) = x^2 + 100x$

$300000 = x^2 + 100x$

$x^2 + 100x - 300000 = 0$

$x^2 - 500x + 600x - 300000 = 0$

$x(x - 500) + 600(x - 500) = 0$

$(x+600)(x - 500) = 0$

$(x+600) = 0$ or $(x - 500) = 0$

$x = -600$ or $x = 500$

Speed cannot be negative, so x = 500

Hence, the usual speed of the plane is 500 km/h.

The value depicted by the pilot here are humanity.

Q. A train travels 180 km at a uniform speed. If the speed had been 9 km/hr more, it would have taken 1 hour less for the same journey. Find the speed of the train.

Solution

Let the speed of train be x km/h.

Distance = 180 km

So, time = $\frac{180}{x}$

When speed is 9 km/h more, time taken = $\frac{180}{x+9}$

According to the given information, $\frac{180}{x} - \frac{180}{x+9} = 1$

$\Rightarrow 180(x + 9) - 180x = x(x + 9)$

$\Rightarrow x^2 + 9x - 1620 = 0$

$\Rightarrow x^2 + 45x - 36x - 1620 = 0$

$\Rightarrow x(x + 45) - 36(x + 45) = 0$

$\Rightarrow x = -45, 36$

Discarding the negative value, speed of the train = 36 kmph.

Benefits of RS Aggarwal Solutions for Class 10 Maths Chapter 10 Exercise 10.5

RS Aggarwal's solutions for Class 10 Maths, including Chapter 10 Exercise 10.5 on Quadratic Equations, offer several benefits that can significantly aid students in mastering this topic. Here are some key advantages:

Clear Explanations: The solutions provide step-by-step explanations for each problem, helping students understand the process and logic behind solving quadratic equations.

Variety of Problems: Exercise 10.5 typically includes a range of problems, from simple to complex. Working through these problems helps students develop a deeper understanding of the different methods used to solve quadratic equations, such as factoring, completing the square, and using the quadratic formula.

Concept Reinforcement: The solutions help reinforce key concepts related to quadratic equations, including the quadratic formula, discriminants, and the nature of roots. This solid foundation is crucial for solving more advanced problems and understanding further mathematical concepts.

Error Correction: By comparing their solutions with the RS Aggarwal solutions, students can identify and correct mistakes, improving their problem-solving skills and accuracy.

Practice and Application: Regular practice with a variety of problems from Exercise 10.5 helps students apply their knowledge effectively. This practice is essential for mastering quadratic equations and performing well in exams.

Time Management: The solutions often include efficient methods for solving problems, which can help students learn how to approach questions in a time-effective manner, crucial for exam settings.