[Aim: 100/100 in Maths]

अभय CLASS 10

Pehchanne का तरीका → D = 2

QUADRATIC EQUATIONS

CHAPTER - 4

Q11: Check is it a quad eqn or not?

$D = 2$

solve?

$$(x^1-2)(x^1+4) = (2x^1-1)(x^1-6)$$

$$x^2 + \underbrace{4x - 2x}_{2x} - 8 = 2x^2 - \underbrace{12x - x}_{-13x} + 6$$

$$0 = x^2 - 15x^1 + 14$$

$D = 2$ ✓ quad.

Roots/zeroes → var. की value (x/y/p/q)

अभय

Methods to find solutions of Quadratic Equation

$$ax^2+bx+c=0$$

- ✓ FACTORISATION (splitting the middle term)
- ✓ Discriminant Method

#Sabr का फल मीठा होता है।

अभय

#LP : Solve for x : $\frac{x-1}{x-2} + \frac{x-3}{x-4} = 3\frac{1}{3}$, $x \neq 2, 4$

A. 5 , 5/2

B. 2 , 5/2

C. -5 , 5/2

D. 5 , -5/2

$\Rightarrow \frac{x-1}{x-2} + \frac{x-3}{x-4} = \frac{10}{3}$

$\Rightarrow \frac{(x-1)(x-4)+(x-3)(x-2)}{(x-2)(x-4)} = \frac{10}{3}$

$\Rightarrow \frac{x^2-4x-x+4+x^2-2x-3x+6}{x^2-4x-2x+8} = \frac{10}{3}$

$\Rightarrow \frac{2x^2-10x+10}{x^2-6x+8} = \frac{10}{3}$

$\Rightarrow \frac{2(x^2-5x+5)}{x^2-6x+8} = \frac{10}{3}$

$3(x^2-5x+5) = 5(x^2-6x+8)$

$3x^2-15x+15 = 5x^2-30x+40$

$0 = 2x^2-15x+25$

$2x^2-15x+25=0$

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

$2x(x-5)-5(x-5)=0$

$(x-5)(2x-5)=0$

$S = -15$

$P = 50$

$x-5=0$

$x=5$

$2x-5=0$

$x=5/2$

अभय

#LP : Solve the following quadratic equation for x: $\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

$\sqrt{3}x^2 + 10x + 7\sqrt{3} = 0$

$\sqrt{3}x^2 + 3x + 7x + 7\sqrt{3} = 0$

$\sqrt{3}x(x+\sqrt{3}) + 7(x+\sqrt{3})$

$(x+\sqrt{3})(\sqrt{3}x+7) = 0$

$x+\sqrt{3}=0$

$x = -\sqrt{3}$

$\sqrt{3}x+7$

$x =$

$S = 10$

$P = 7\sqrt{3} \times \sqrt{3}$

$= 7 \times 3 = 21$

3 | 21

7 | 7

| 1

$ax^2 + bx + c = 0$

$ax^2 \quad x \quad x \quad + c$

x^2, x, x, c

common

$ax^2+bx+c=0$

अभय

#LP : Solve the following quadratic equation by factorization method :

i. $x^2 - 2ax + a^2 - b^2 = 0$

$$x^2 - 2ax + a^2 - b^2 = 0$$

$$\Rightarrow x^2 - (a+b)x - (a-b)x + (a+b)(a-b) = 0$$

$$\Rightarrow x(x-(a+b)) - (a-b)[x-(a+b)] = 0$$

$S = -2a$

$P = a^2 - b^2$

$\Rightarrow -(a+b)-(a-b)$

$\Rightarrow -a-b-a+b$

$\Rightarrow -2a$

$$[x-(a+b)]\,[x-(a-b)] = 0$$

$x-(a+b)=0$

$x = a+b$

$x-(a-b)=0$

$x = a-b$

#LP : Solve the following quadratic equation by factorization method :

$a^2b^2x^2 + b^2x - a^2x - 1 = 0$

$$\underbrace{(a^2b^2)x^2}_{x^2} + \underbrace{b^2x}_{x} - \underbrace{a^2x - 1}_{c} = 0$$

directly common लेंगे

$$b^2x[a^2x+1] - [a^2x+1] = 0$$

$$[a^2x+1][b^2x-1] = 0$$

$a^2x+1=0$ | $b^2x-1=0$

$a^2x=-1$ | $b^2x=1$

$x=-\frac{1}{a^2}$ | $x=\frac{1}{b^2}$

HW Cbse

अभय

#LP : Solve the following quadratic equation by factorization method :

$$\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, \; a+b \neq 0$$

$$\frac{1}{a+b+x} - \frac{1}{x} = \frac{1}{a} + \frac{1}{b}$$

now take LCM

Word Problems ?? → line by line solve

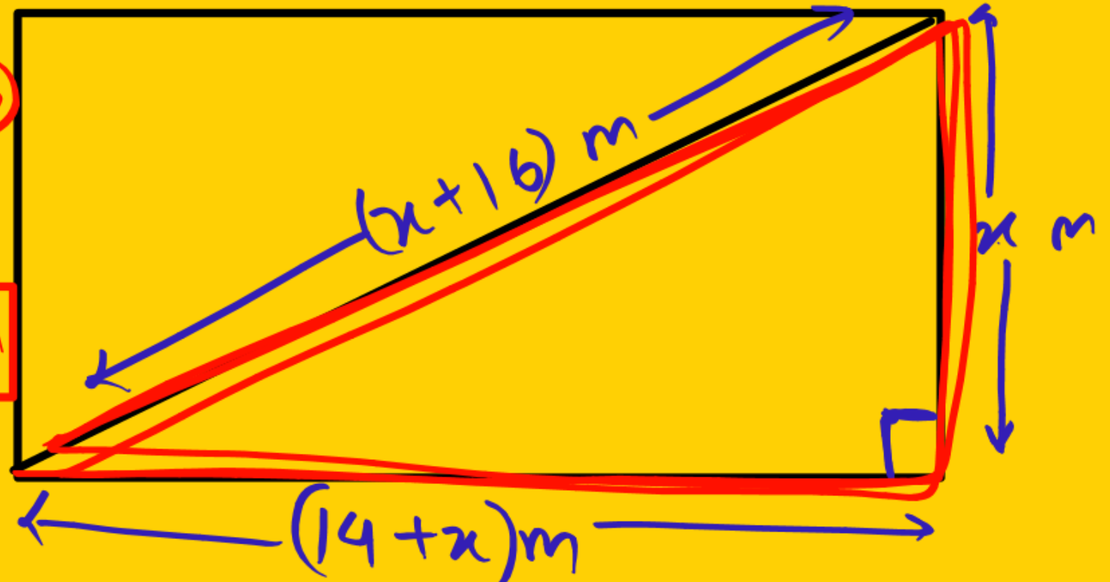
अभय

#LP : The diagonal of a rectangular field is 16 meters more than the shorter side. If the longer side is 14 meters more than the shorter side, then find the lengths of the side of the field.

Let shorter side = x m

$l = (14 + x)$ m $= 14 + 10 \Rightarrow 24$ m

$b = (x)$ m $= 10$ m



Right angled △ → Pythagorus theorem

$H^2 = P^2 + B^2$

$(x+16)^2 = (x)^2 + (14+x)^2$

solve

$x = 10, -8$ (length cannot be -ve)

Discriminant Method of Finding Roots :

$$ax^2+bx+c=0$$

$$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$$

$= \frac{-b+\sqrt{b^2-4ac}}{2a}$ → Powerful term

$\frac{-b-\sqrt{b^2-4ac}}{2a}$

eg:- x^2-x-2

$$x = \frac{-(-1) \pm \sqrt{(-1)^2-4(1)(-2)}}{2(1)}$$

$$= \frac{1 \pm \sqrt{1+8}}{2}$$

$$\Rightarrow \frac{1 \pm \sqrt{9}}{2} \Rightarrow \frac{1 \pm 3}{2}$$

$\frac{1+3}{2} \Rightarrow \frac{4}{2} \Rightarrow 2$

$\frac{1-3}{2} \Rightarrow \frac{-2}{2} \Rightarrow -1$

cbse 2025

Nature Of Roots :

$ax^2+bx+c=0$ → calculate → $D = b^2 - 4ac$ (Discrimint)

- $D > 0$ → real & distinct roots
- $D = 0$ → real & equal roots
- $D < 0$ → no real roots

अभय

#LP : For what value of k, the equation $3x^2 + 2x + k = 0$ will have real roots

a) $k \leq \frac{1}{3}$

b) $k \geq \frac{1}{3}$

c) $k = \frac{2}{3}$ only

d) None of the above

$D \geq 0$

$b^2 - 4ac \geq 0$

$(2)^2 - 4(3)(k) \geq 0$

$4 - 12k \geq 0$

$4 \geq 12k$

$\frac{1}{3}\frac{4}{12} \geq k$

$k \leq \frac{1}{3}$

HW

अभय

LP : If the roots of $(b-c)x^2 + (c-a)x + (a-b) = 0$ are real and equal than which of the following is true:

$D = 0$

a) $2b = a + c$
b) $2a = b + c$
c) $2c = a + b$
d) $2b - a - c$

$(a+b+c)^2 = a^2+b^2+c^2+2ab+2bc+2ca$

d, s, t → d = s × t

अभय

#LP: In a flight of 600 km, an aircraft was slowed due to bad weather. Its average speed for the trip was reduced by 200 km/hr and time of flight increased by ~~30 minutes~~ ½ hr find the original duration of flight.

Let original speed ⇒ x km/hr

original time ⇒ y hr ??

d = 600 km

s × t = 600

xy = 600

$x = \frac{600}{y}$

A10

s ↓ ⇒ t ↑

s' = (x − 200) km/hr

$t' = \left(y + \frac{1}{2}\right)$ hr

d = 600 km

s' × t' = 600

$(x-200)\left(y+\frac{1}{2}\right) = 600$

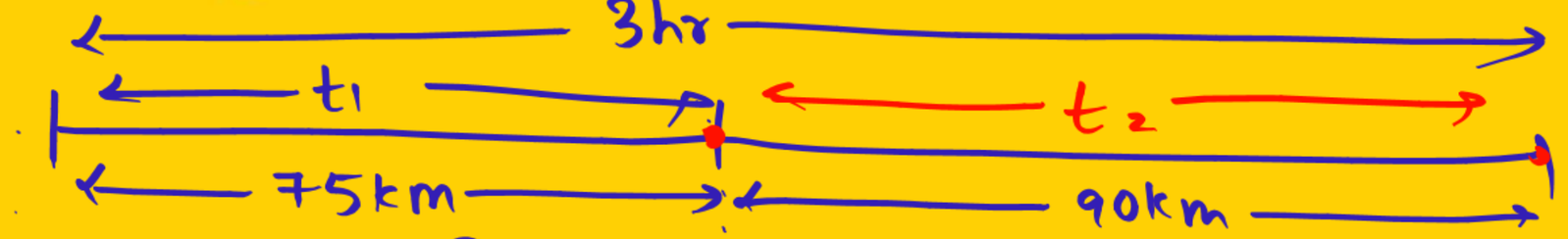
$\left(\frac{600}{y} - 200\right)\left(y+\frac{1}{2}\right) = 600$

solve

$d = s \times t$ → $t = \frac{d}{s}$

अभय

#LP: A bus travels at a certain average speed for a distance of 75 km and then travels a distance of 90 km at an average speed of 10 km/h more than the first speed. If it takes 3 hours to complete the total journey, find its first speed.



let Speed = x km/hr

$s' = (10 + x)$ km/hr

$\Downarrow$

$d = 75$

$s = x$

$t_1 = \frac{75}{x}$

$t_2 = \frac{90}{10+x}$

Ans

Total time = 3

$t_1 + t_2 = 3$

$\frac{75}{x} + \frac{90}{10+x} = 3$

अभय

#LP : The numerator of a fraction is 3 less than its denominator. If 1 is added to the denominator, the fraction is decreased by 1/15. Find the fraction.

1

Let den $= x$

A/Q num $= (x-3)$ $\longrightarrow$ $F = \frac{x-3}{x}$

$F' = \frac{x-3}{x+1}$

$F' = F - \frac{1}{15}$

$\frac{x-3}{x+1} = \frac{x-3}{x} - \frac{1}{15}$

#LP : The speed of a boat in still water is 8 km/hr. It can go 15km upstream and 22 km downstream in 5 hours. Find the speed of the stream.

#LP : The sum of squares of two consecutive natural numbers is 313. Find the numbers.

#LP : The sum of two number is 15. If the sum of their reciprocal is 3/10. Find the number.

THANK YOU

COODIES 🥰