UDAAN

2025

Quadratic Equation

Mathematics | Lecture - 07

By – Ritik Sir

Topics

to be covered

1. Word Problems on Ages
2. Word Problems on Geometry
3. Questions based on Time and Work
4. Questions based on Miscellaneous Problems

5. Word Problems (Part - 03)


WORK HARD
DREAM BIG
NEVER GIVE UP !!

Topic : Word Problems on Ages

#Q. One year ago, a man was 8 times as old as his son. Now his age is equal to the square of his son's age. Find their present ages.

$x-1 = 8(y-1)$

$x-1 = 8y-8$

$x-8y=-7$ ①

$x=y^2$ ②

$y^2-8y+7=0$

$-7, -1$

$y^2-7y-1y+7=0$ Mon

$y(y-7)-1(y-7)=0$ Son

$(y-1)(y-7)=0$

$y=1, y=7$

$y=1$, $x=y^2 \Rightarrow x=1$

$y=7$, $x=y^2 \Rightarrow x=49$

Da.	Dx.	Fu.
$x-1$	x	X
$y-1$	y	X

not possible.

Ans: Man's age = 49 years

Son's age = 7 years

Topic : Word Problems on Ages

#Q. The sum of the reciprocal of Rehman's ages (in years) 3 years ago and 5 years from now is 1/3. Find his present age. [NCERT]

$$\frac{1}{x-3} + \frac{1}{x+5} = \frac{1}{3}$$

$$\frac{1(x+5) + 1(x-3)}{(x-3)(x+5)} = \frac{1}{3}$$

	past	Pr.	Fu.
Rehman	$x-3$	x	$x+5$

Ans: 7 years

Topic : Word Problems on Ages

#Q. If Zeba were younger by 5 years than what she really is, then the square of her age (in years) would have been 11 more than 5 times her actual age. What is her age now? [NCERT Exemplar]

$$(x-5)^2 = 11+5\times(x)$$

$$x^2+25-10x = 11+5x$$

$$\boxed{x^2-15x+14=0}$$

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

$$x(x-14)-1(x-14)=0$$

$$(x-14)(x-1)=0$$

$$\boxed{x=14,\ x=1}$$

Pa.	Pa.	Fu.
x-5	x	X

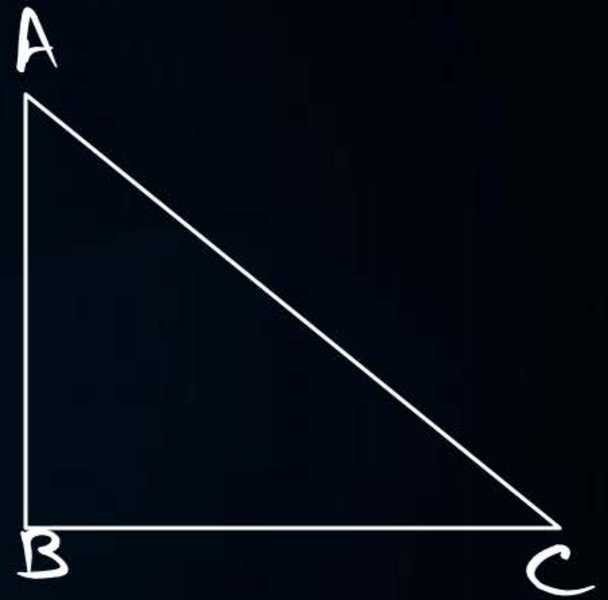
Zeba

Ans: 14 years

not possible.

Topic : Word Problems on Geometry

#Q. The hypotenuse of right-angled triangle is 6 meters more than twice the shortest side. If the third side is 2 meters less than the hypotenuse, find the sides of the triangle.



Shortest side = x

Hypotenuse = $6+2x$

Third side = $6+2x-2 = 4+2x$

By P.T

$AC^2 = AB^2 + BC^2$

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

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

$$36 + 4x^2 + 24x = x^2 + 16 + 4x^2 + 16x$$

$$0 = x^2 + 16 + 16x - 36 - 24x$$

$$\boxed{0 = x^2 - 8x - 20}$$

$$10, -2$$

Ans: Hypo = 26cm

Shortest side = 10cm

Third side = 24cm

Topic : Word Problems on Geometry

#Q. The area of a right angled triangle is 600 cm^2. If the base of the triangle exceeds the altitude by 10 cm, find the dimensions of the triangle.

Area = 600 cm^2

Altitude = x

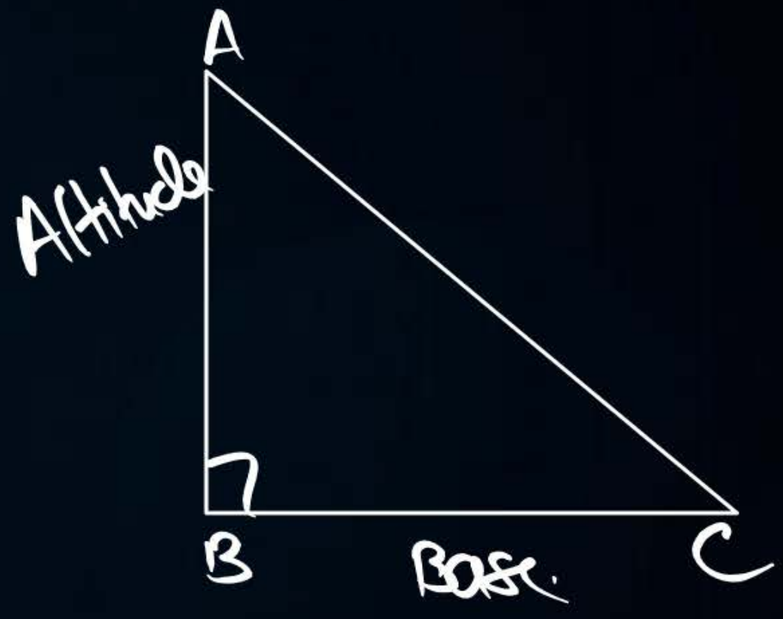
Base = $x+10$

$\frac{1}{2} \times b \times h = 600$

$\frac{1}{2} \times (x+10)(x) = 600$

$x^2 + 10x = 1200$

$x^2 + 10x - 1200 = 0$



$x^2 + 10x - 1200 = 0$

$S = 10, \quad P = -1200$

40, −30

$x^2 + 40x - 30x - 1200 = 0$

$x(x+40) - 30(x+40) = 0$

$(x+40)(x-30) = 0$

$x = -40$ ← neglect.

$x = 30$

∴ Base = 40 cm

Altitude = 30 cm.

Hypo ⟹ Hw

Unit kadhyan Rakho

Topic : Word Problems on Geometry

#Q. The length of a rectangle exceeds its width by 8 cm and the area of the rectangle is 240 sq. cm. Find the dimension of the rectangle.

Let $b = w = x$

$\therefore l = x + 8$

Area of Rectangle = 240

$lb = 240$

$(x+8)x = 240$

Ans: $l = 20$ cm

$b = 12$ cm

Topic : Word Problems on Geometry

#Q. The perimeter of a right triangle is 60 cm. If hypotenuses is 25 cm. Find the area of the triangle. [CBSE 2016]

Perimeter = 60cm

$AB+BC+AC=60$

$AB+BC+25=60$

$AB+BC=35$

Let $BC=x$,

$AB+x=35-x$

$AB=35-x$

$(25)^2=(35-x)^2+x^2$

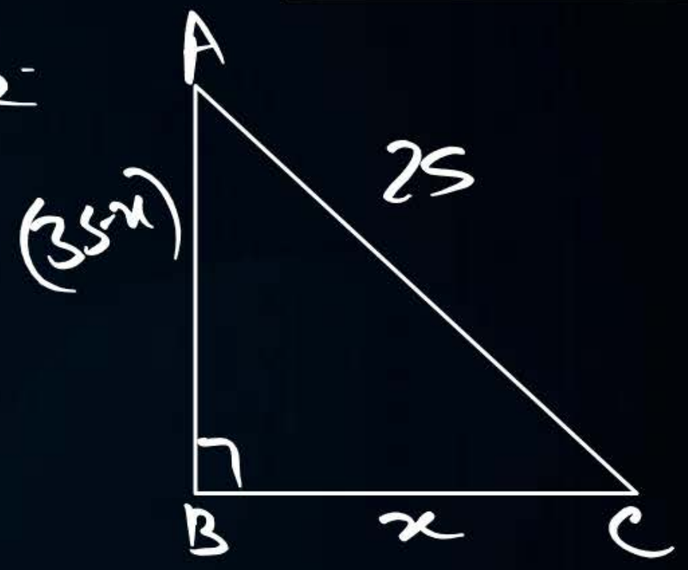
$625=1225+x^2-70x+x^2$

$0=2x^2-70x+600$

$0=2(x^2-35x+300)$

$0=x^2-35x+300$

$-20, -15$



Ans: Area of triangle = $150cm^2$

Topic : Word Problems on Geometry

#Q. Is it possible to design a rectangular park of perimeter 80 m and area 400m^2. If so, find its length and breadth. [NCERT]

$l = x$

$b = y$

$A = 400$, $P = 80$

$lb = 400$, $l + b + l + b = 80$

$xy = 400$ $\quad 2l + 2b = 80$

$2(l + b) = 80$

$l + b = 40$

$x + y = 40$ — (2)

$y = 40 - x$

$A = 400m^2$

$P = 80m$

$xy = 400$

$x(40-x) = 400$

$40x - x^2 = 400$

$0 = x^2 - 40x + 400$

$ax^2 + bx + c = 0$

$a = 1, b = -40, c = 400$

$D = b^2 - 4ac$

$= (-40)^2 - 4(1)(400)$

$= 1600 - 1600$

$D = 0$

Real and Equal Roots.

∴ It is possible...

Solve this

Ans : $l = 20cm$

$b = 20cm$

Topic : Word Problems on Geometry

#Q. Sum of the areas of two squares is 640 m^2. If the difference of their perimeter is 64 m, find he sides of the two squares. [NCERT, CBSE 2008]

$A_1 + A_2 = 640$, $P_2 - P_1 = 64$

Area = $(\text{Side})^2$

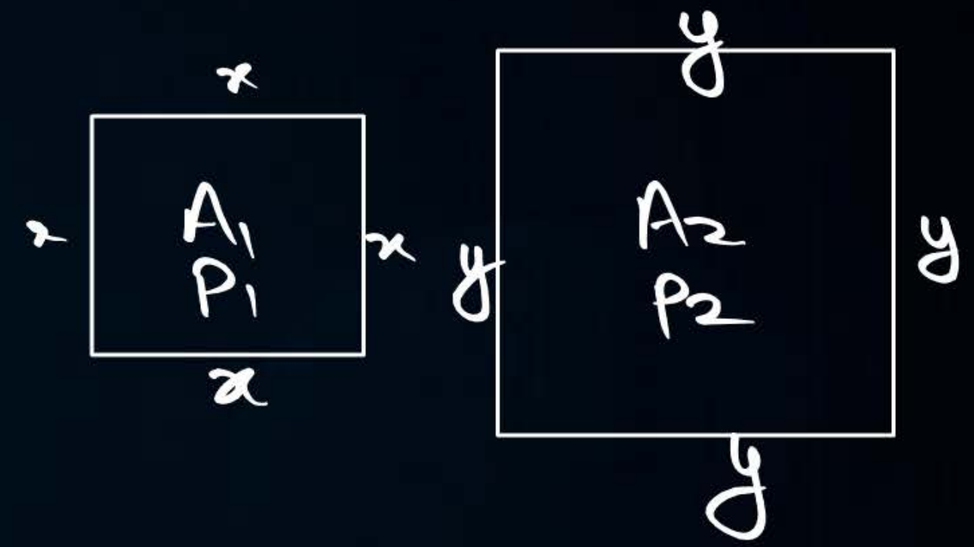
Perimeter = $4(\text{Side})$

$4y - 4x = 64$

$4(y - x) = 64$

$y - x = 16$ (2)

$x^2 + y^2 = 640$ (1)



$x^2+y^2=640$, $y-x=16$

$y-16=x$

$(y-16)^2+y^2=640$

$y^2+16^2-2(y)(16)+y^2=640$

$2y^2+256-32y=640$

$2y^2-32y+256-640=0$

$2y^2-32y-384=0$

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

$S=-16,\ P=-192$

$-24, 8$

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

$y^2-24y+8y-192=0$

$y(y-24)+8(y-24)=0$

$(y-24)(y+8)=0$

$y=24$, $y=-8$

Ans: 8cm, 24cm

$y-16=x$

$8=x$

Topic : Miscellaneous Problems

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

[CBSE 2014, NCERT]

Maths x → $x+2$

English $30-x$ → $30-x-3$

$$(x+2)(30-x-3)=210$$

$$(x+2)(27-x)=210$$

$$27x-x^2+54-2x=210$$

$$\boxed{-x^2+25x-156=0}$$

Ans: Two possible answers:

If M = 12, then E = 18

If M = 13, then E = 17

Topic : Miscellaneous Problems

#Q. In a class test, the sum of the marks obtained by P in Mathematics and science is 28. Had he got 3 marks more in Mathematics and 4 marks less in Science. The product of his marks, would have been 180. Find his marks in the two subjects.

[CBSE 2008]

H.W

Ans: Two possible answers:

M = 12	M = 9
S = 16	S = 19

Factory

200 items/Articles.

Cost of each article = 10 RS.

Total cost = no. of articles × cost of each article.

Topic : Miscellaneous Problems

Ans: $x = 6$ articles.
$y = 15$ Rs

#Q. 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 produces 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. [NCERT]

Let no. of articles produced = x

Let cost of each article = y

Total cost = xy

$y = 3 + 2x$

Total cost = 90

total cost = no. of articles × cost of each article

$90 = x(3 + 2x)$

Homework

DPP

THANK YOU