UDAAN

2026

Quadratic Equations

MATHS LECTURE-8

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Topics *to be covered*

A Word Problems Part-3

Total cost = no of things X cost of one thing.

#Q. If the list price of a toy is reduced by ₹ 2, a person can buy 2 toys more for ₹ 360. Find the original price of the toy.

CBSE 2002

Let no. of toys = x.

Let cost of each toy = y.

(I) $\therefore$ Total cost = xy

$360 = xy$ — (1)

(II) no. of toys = $x+2$

cost of each toy = $y-2$

Total cost = $(x+2)(y-2)$

$360 = (x+2)(y-2)$

$360 = xy - 2x + 2y - 4$

$360 = 360 - 2x + 2y - 4$

$2x - 2y = -4$

$x - y = -2$ — (2)

$x - \frac{360}{x} = -2$

Ans. ₹ 20

#Q. A shopkeeper buys a number of books for ₹80. If he had bought 4 more books for the same amount, each book would have cost ₹1 less. how many books did he buy?

CBSE 2012

Case I Let no. of books $= x$

Cost of each book $= y$

$T.C = xy$

$80 = xy$ ... (1)

Case II

no. of books $= x + 4$

Cost of each book $= y - 1$

$T.C = (x+4)(y-1)$

$86 = xy - x + 4y - 4$

$x - 4y = -4$ ... (2)

$x - 4\left(\frac{80}{x}\right) = -4$

Ans. 16

#Q. ₹ 9000 were divided equally among a certain number of persons. Had there been 20 more persons, each would have got ₹ 160 less. Find the original number of persons.

Case I

no. of persons = x

each gets = y

Total = $x \times y$

$9000 = xy$ ①

Case II

no. of persons = $x + 20$

each gets = $y - 160$

Total = $(x+20)(y-160)$

$9000 = xy - 160x + 20y - 3200$

$160x - 20y = -3200$

$8x - y = -160$ ②

Ans. 25

#Q. At t minutes past 2 pm the time needed by the minutes hand and a clock to show 3 pm was found to be 3 minutes less than $t^2/4$ minutes. Find t.

#GPY

NCERT EXAMPLER

Ans. 14 minutes

#Q. Two water taps together can fill a tank in $1\frac{7}{8}$ hours. The tap with longer diameter takes 2 hours less than the tap with the smaller one to fill the tank separately. Find the time in which each tap can fill the tank separately.

$\frac{15}{8}$

Let, tap with smaller diameter fill the tank in = x hr

∴ " " larger diameter " " " " " = $x-2$ hr

CBSE 2019, 23

L.D

1 unit = $x-2$ hr

$\frac{1}{x-2}$ unit = 1 hr

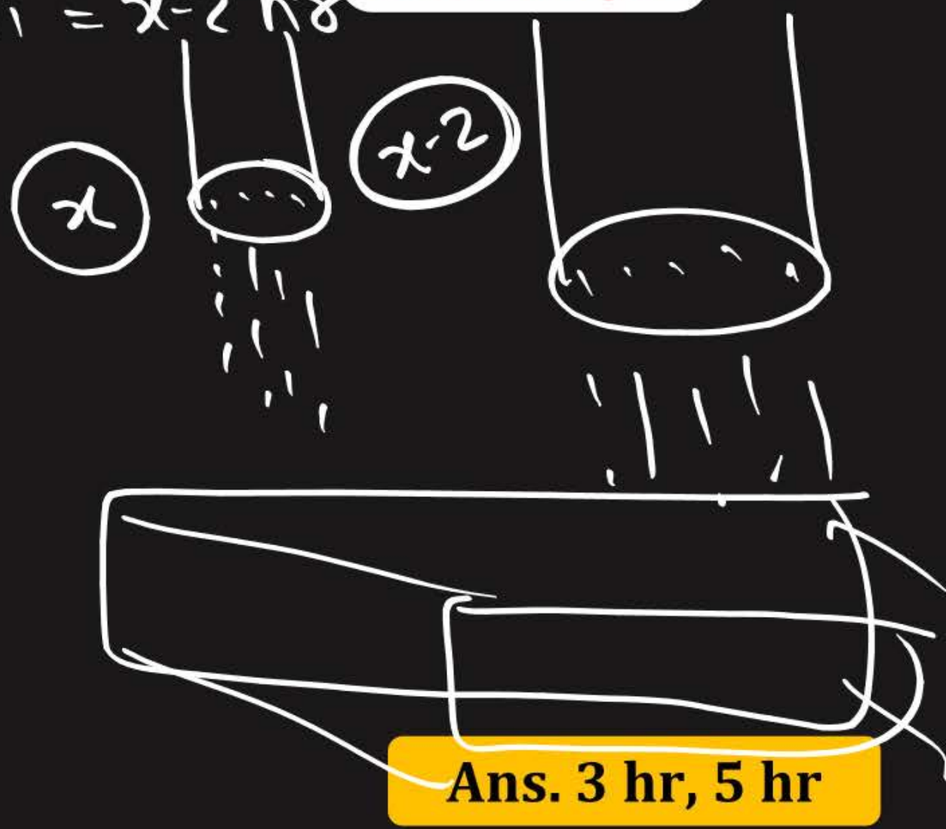
$\frac{15}{8(x-2)}$ u = $\frac{15}{8}$ hr

S.D

1 unit = x hr

$\frac{1}{x}$ unit = 1 hr

$\frac{15}{8x}$ u = $\frac{15}{8}$ hr



Ans. 3 hr, 5 hr

$$\frac{15}{8(x-2)} + \frac{15}{8x} = 1$$

$$\frac{15}{8}\left[\frac{1}{x-2} + \frac{1}{x}\right] = 1$$

$$\boxed{\frac{1}{x-2} + \frac{1}{x} = \frac{8}{15}}$$

1 unit = x hr

$\frac{1}{x}$ unit = 1 hr

$\frac{15}{8x}$ unit = $\frac{15}{8}$ hr

1 unit = $x-2$ hr

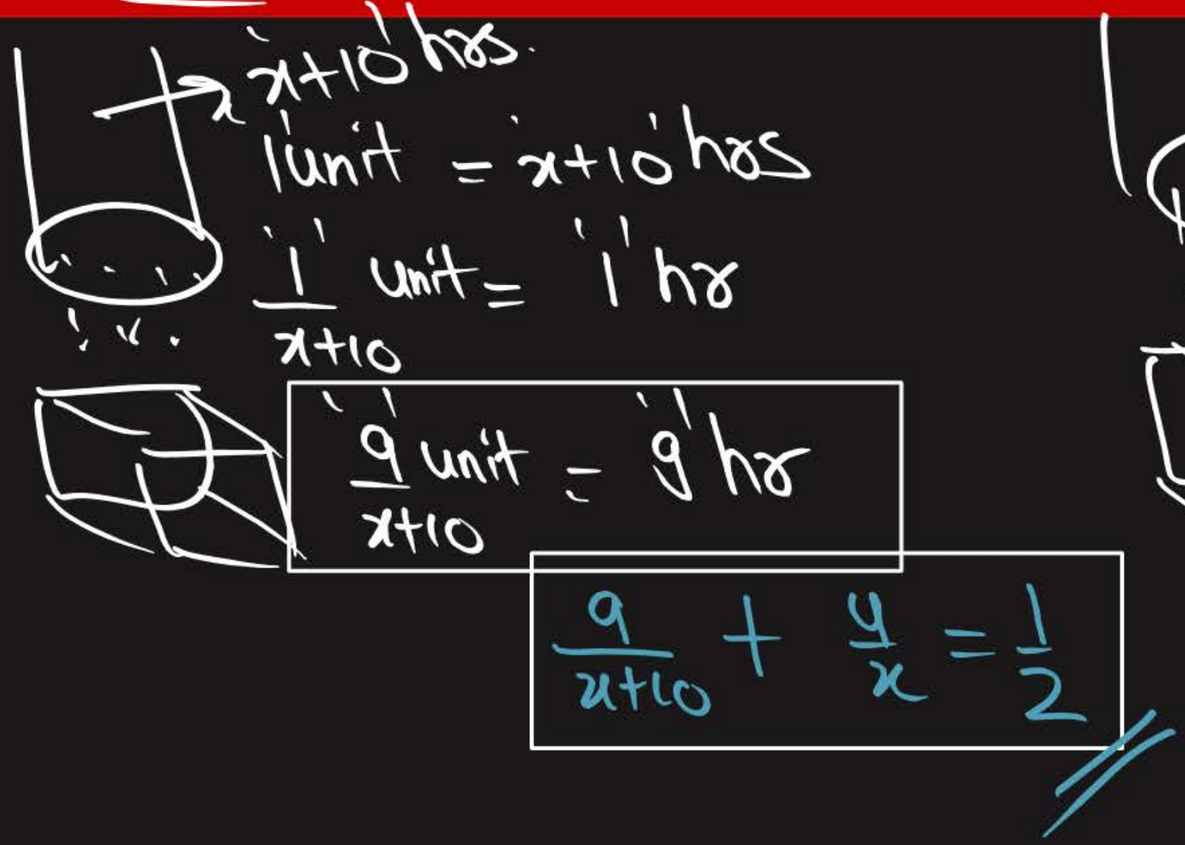
$\frac{1}{x-2}$ unit = 1 hr

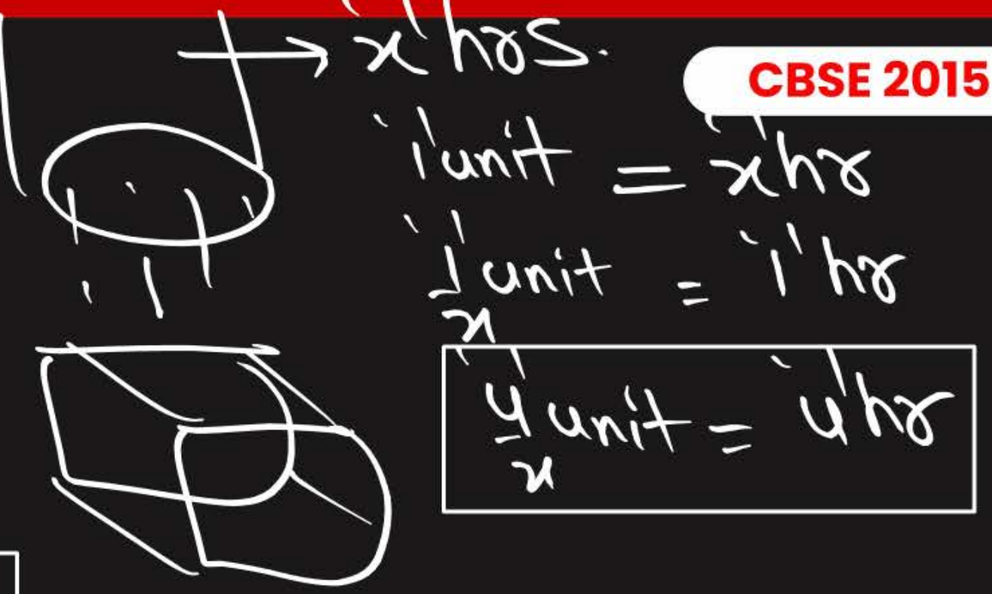
$\frac{15}{8(x-2)}$ unit = $\frac{15}{8}$ hr

$$\frac{15}{8x} + \frac{15}{8(x-2)} = 1$$

#Q. To fill a swimming pool two pipes are used. If the pipe of larger diameter used for 4 hours and the pipe of smaller diameter for 9 hours, only half of the pool can be filled. Find, how long it would take for each pipe to fill the pool separately, if the pipe of smaller diameter takes 10 hours more than the pipe of larger diameter to fill the pool?

CBSE 2015





$$\frac{9}{x+10} + \frac{y}{x} = \frac{1}{2}$$

Ans. 20 hr, 30 hr

#Q. A takes 6 days less than the time taken by B to finish a piece of work. If both A and B together can finish it in 4 days, find the time taken by B to finish the work.

CBSE 2017

A

$x-6$

1 unit = $x-6$ days

$\frac{1}{x-6}$ unit = 1 day

$\frac{4}{x-6}$ unit = 4 day

B

x

1 unit = x days

$\frac{1}{x}$ unit = 1 day

$\frac{4}{x}$ unit = 4 day

A+B → 4 days.

$$\frac{4}{x-6} + \frac{4}{x} = 1$$

$$4\left[\frac{1}{x-6} + \frac{1}{x}\right] = 1$$

$$\frac{x + x - 6}{(x-6)(x)} = \frac{1}{4}$$

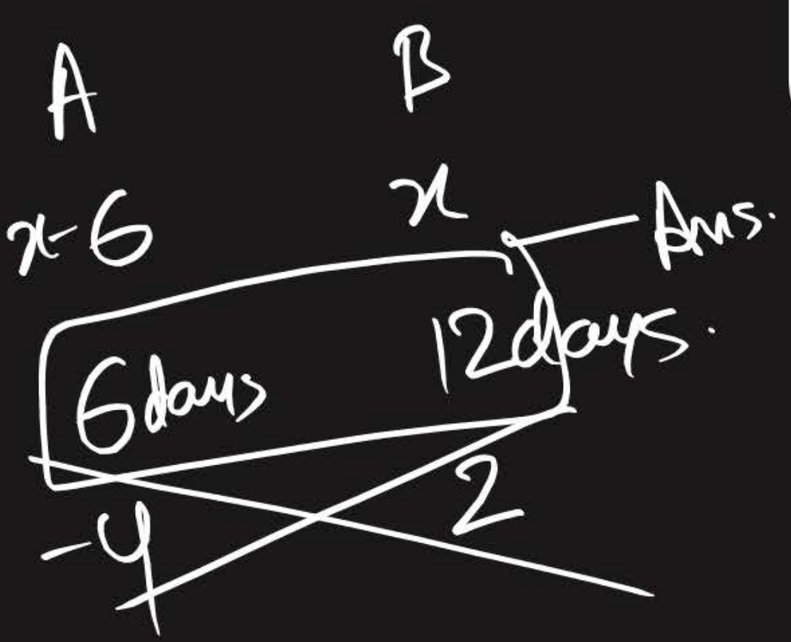
$$\frac{2x-6}{x^2-6x} = \frac{1}{4}$$

$$8x - 24 = x^2 - 6x$$

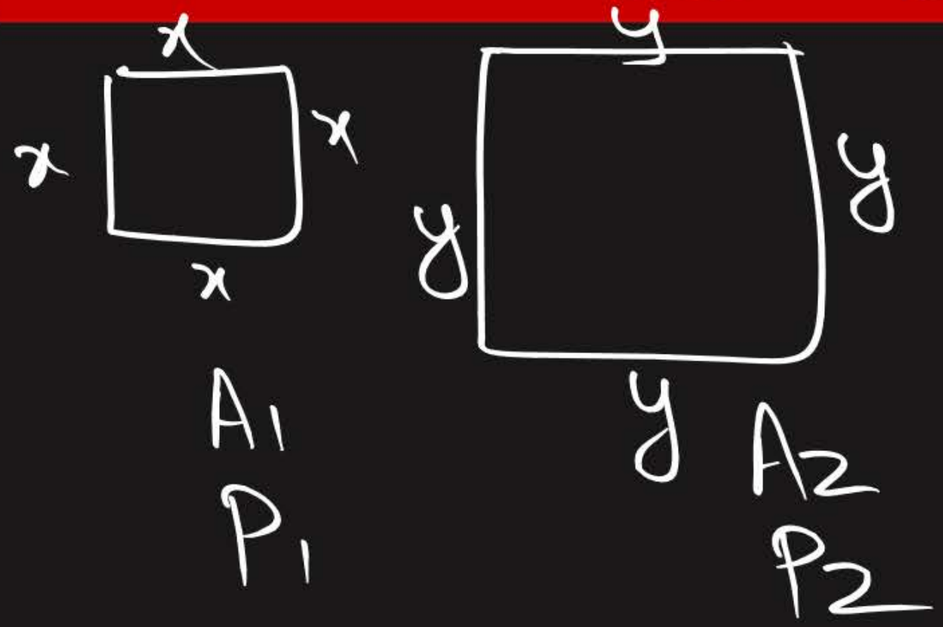
$$0 = x^2 - 14x + 24$$

$-12, -2$

$x = 12, 2$



#Q. Sum of the areas of two squares is 640 m^2. if the difference of their perimeters is 64 m, find the sides of the two squares.



CBSE 2008, 13

$A_1 + A_2 = 640$

$x^2 + y^2 = 640$ — (1)

$P_2 - P_1 = 64$

$4y - 4x = 64$

$y - x = 16$ — (2)

$y = 16 + x$

Ans. 24m, 8m

$x^2 + y^2 = 640$

$x^2 + (x+16)^2 = 640$

$x^2 + x^2 + 256 + 32x = 640$

$2x^2 + 32x - 384 = 0$

$\boxed{x^2 + 16x - 192 = 0}$

Sum = 16, product = −192

24, −8

$x = -\cancel{24}, 8$

$x = 8$

$y = 16 + x$

$y = 24$

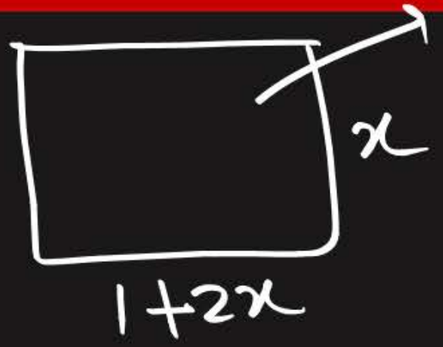
#Q. The area of a rectangular plot is 528 m^2. The length of the plot (in meters) is one metre more then twice its breadth. Find the length and the breadth of the plot.

CBSE 2014

$A = lb$

$528 = lb$ ①

$l = 1 + 2b$ ②

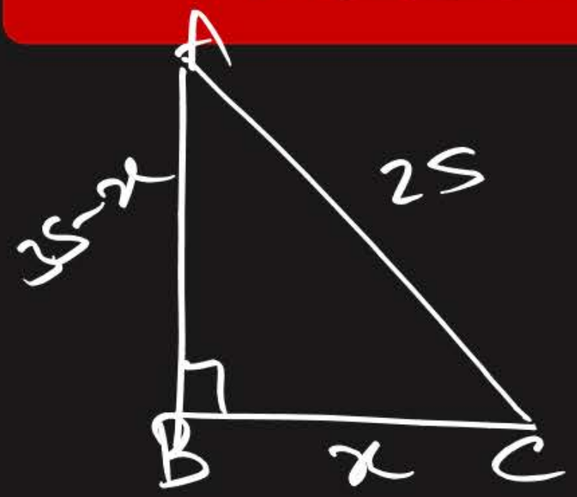


$A = lb$

$528 = (1+2x)(x)$

Ans. 33m, 16m

#Q. The perimeter of a right triangle is 60 cm. Its hypotenuse is 25 cm. Find the area of the triangle.



$P = AB + BC + AC$

$60 = AB + x + 25$

$35 - x = AB$

P.G.T

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

$A = \frac{1}{2} \times \text{base} \times \text{height}$

$A = \frac{1}{2} \times BC \times AB$

M.II

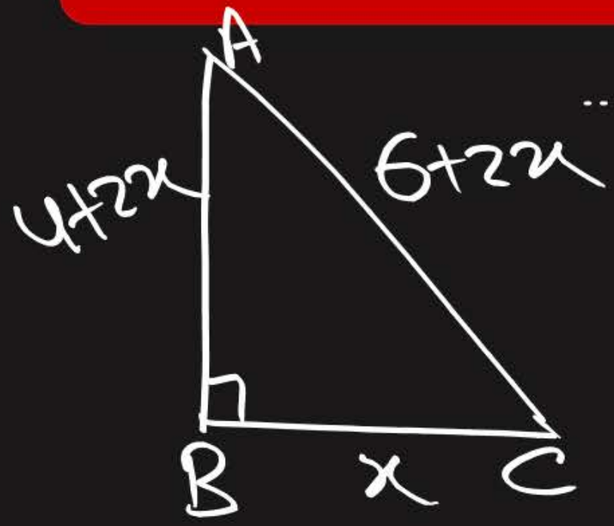
CBSE 2016

$x + y + 25 = 60$ (1)

$x^2 + y^2 = 25$ (2)

Ans. $150 cm^2$

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



Let shortest side = BC = x

AC = 6 + 2x

AB = 6 + 2x − 2

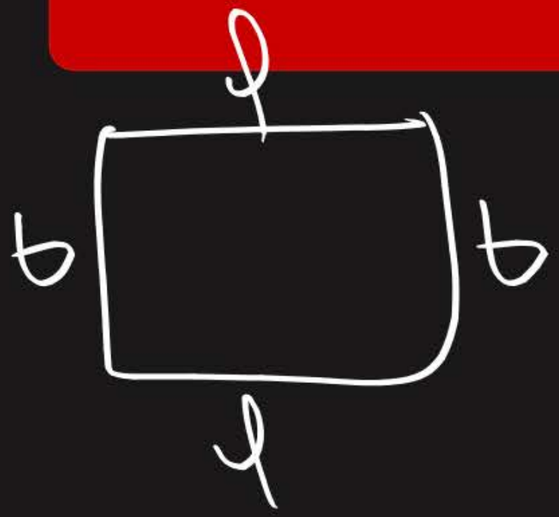
= 4 + 2x

third side

Ans. 10m, 26m and 24m

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

NCERT



$P = 80$

$2l + 2b = 80$

$l + b = 40$ — (1)

$A = 400$

$lb = 400$ — (2)

$b = 40 - l$

$l(40 - l) = 400$

$40l - l^2 = 400$

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

$D = b^2 - 4ac$

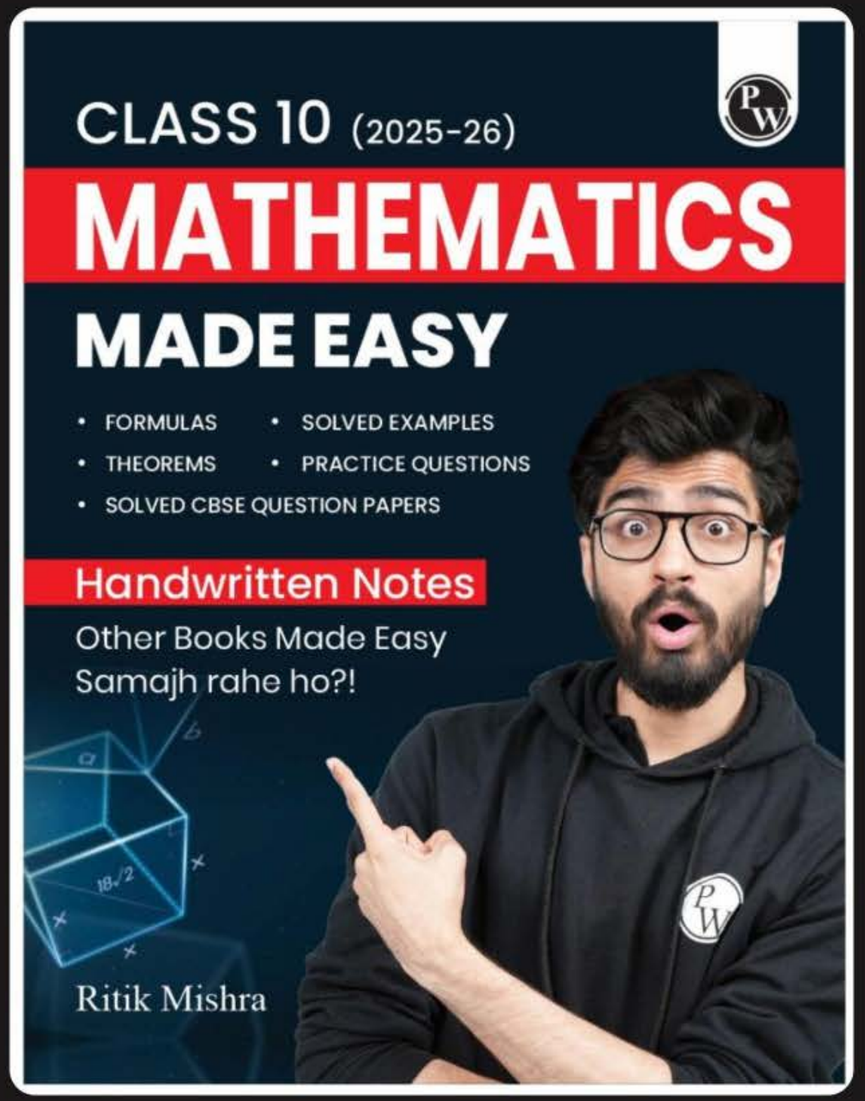
$D = (40)^2 - 4(1)(400)$

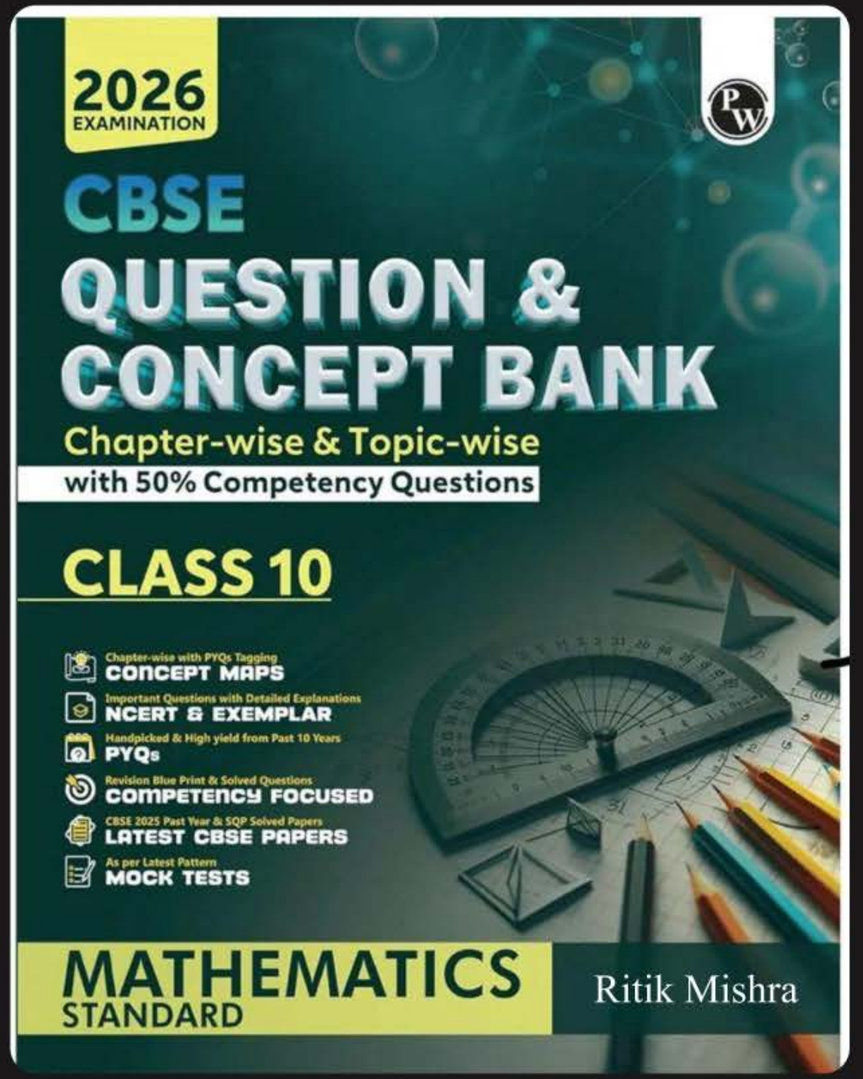
$= 1600 - 1600 = 0$

Nature = real and equal.

Yes, it is possible

Ans. Yes, 20m, 20m





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