

TYBA COACHING CENTRE | टी वाई बी ए कोचिंग सेंटर

Contact / WhatsApp: 6367029449 • NCERT Class 10 Mathematics Complete Comprehensive Notes & Solutions

Chapter 4: Quadratic Equations

अध्याय 4: द्विघात समीकरण

Section 1: Detailed Concepts, Standard Form & Nature of Roots

खंड 1: विस्तृत अवधारणाएँ, मानक रूप एवं मूलों की प्रकृति

4.1 Introduction & Standard Form of Quadratic Equations / 4.1 भूमिका एवं द्विघात समीकरण का मानक रूप

[English Theory]: A quadratic equation in the variable x is an equation of the form:

$ax^2 + bx + c = 0$, where a, b, c are real numbers and $a \neq 0$.

- Any equation of the form $p(x) = 0$, where $p(x)$ is a polynomial of degree 2, is a quadratic equation.
- When the terms of $p(x)$ are written in descending order of their degrees, we obtain the standard form.
- Examples in everyday life: Throwing a ball (projectile trajectory), areas of rectangular enclosures where length depends on breadth, revenue models, and time-distance problems with varying speeds.

[हिंदी सिद्धांत]: चर x में एक द्विघात समीकरण $ax^2 + bx + c = 0$ के प्रकार की होती है, जहाँ a, b, c वास्तविक संख्याएँ हैं तथा $a \neq 0$ है।

- $p(x) = 0$ के प्रकार का कोई भी समीकरण, जहाँ $p(x)$ घात 2 का एक बहुपद है, द्विघात समीकरण कहलाता है।
- जब हम पदों को उनकी घातों के घटते क्रम में लिखते हैं, तो हमें मानक रूप प्राप्त होता है।
- दैनिक जीवन में अनुप्रयोग: प्रक्षेप्य गति, आयताकार भूखंडों के क्षेत्रफल, लागत व लाभ मॉडल, तथा चाल-दूरी संबंधी प्रश्न।

4.2 Solution by Factorisation (Splitting the Middle Term) / 4.2 गुणनखंडन द्वारा द्विघात समीकरण का हल

[English Theory]: A real number α is called a **root** of the quadratic equation $ax^2 + bx + c = 0$ if $a\alpha^2 + b\alpha + c = 0$.

Note: The zeroes of the quadratic polynomial $ax^2 + bx + c$ and the roots of the quadratic equation $ax^2 + bx + c = 0$ are identical.

To solve by factorisation, we split the linear term bx into two terms whose coefficients have sum b and product ac . We then factorise into two linear factors $(px + q)(rx + s) = 0$. By the zero-product property, either $px + q = 0$ or $rx + s = 0$.

[हिंदी सिद्धांत]: एक वास्तविक संख्या α द्विघात समीकरण $ax^2 + bx + c = 0$ का एक **मूल (Root)** कहलाती है, यदि $a\alpha^2 + b\alpha + c = 0$ हो।

टिप्पणी: द्विघात बहुपद के शून्यक और द्विघात समीकरण के मूल एक ही होते हैं।

गुणनखंडन विधि में हम मध्य पद bx को ऐसे दो पदों में विभक्त करते हैं जिनका योग b और गुणनफल ac हो। तत्पश्चात दो रैखिक गुणनखंड $(px + q)(rx + s) = 0$ प्राप्त कर शून्यक ज्ञात करते हैं।

4.3 The Quadratic Formula (Sridharacharya Formula) & Nature of Roots / 4.3 द्विघाती सूत्र (श्रीधराचार्य सूत्र) एवं मूलों की प्रकृति

[English Theory]: Quadratic Formula: The roots of $ax^2 + bx + c = 0$ ($a \neq 0$) are given by:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \text{ (provided } b^2 - 4ac \geq 0 \text{)}.$$

The quantity $D = b^2 - 4ac$ is called the **Discriminant (विविक्तकर)**.

Three Conditions for Nature of Roots:

- $D > 0$:** Two distinct real roots: $x = \frac{-b + \sqrt{D}}{2a}$ and $x = \frac{-b - \sqrt{D}}{2a}$.
- $D = 0$:** Two equal real roots (coincident roots): $x = -b/(2a)$.
- $D < 0$:** No real roots exist (the roots are imaginary / complex numbers).

[हिंदी सिद्धांत]: द्विघाती सूत्र: समीकरण $ax^2 + bx + c = 0$ के मूल निम्न सूत्र से ज्ञात होते हैं:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \text{ (यदि } b^2 - 4ac \geq 0 \text{ हो)}.$$

राशि $D = b^2 - 4ac$ को द्विघात समीकरण का **विविक्तकर (Discriminant)** कहते हैं।

मूलों की प्रकृति के तीन नियम:

1. यदि $D > 0$, तो दो भिन्न वास्तविक मूल होते हैं।
2. यदि $D = 0$, तो दो बराबर (संपाती) वास्तविक मूल होते हैं: $x = -b/(2a)$ ।
3. यदि $D < 0$, तो कोई वास्तविक मूल नहीं होता।

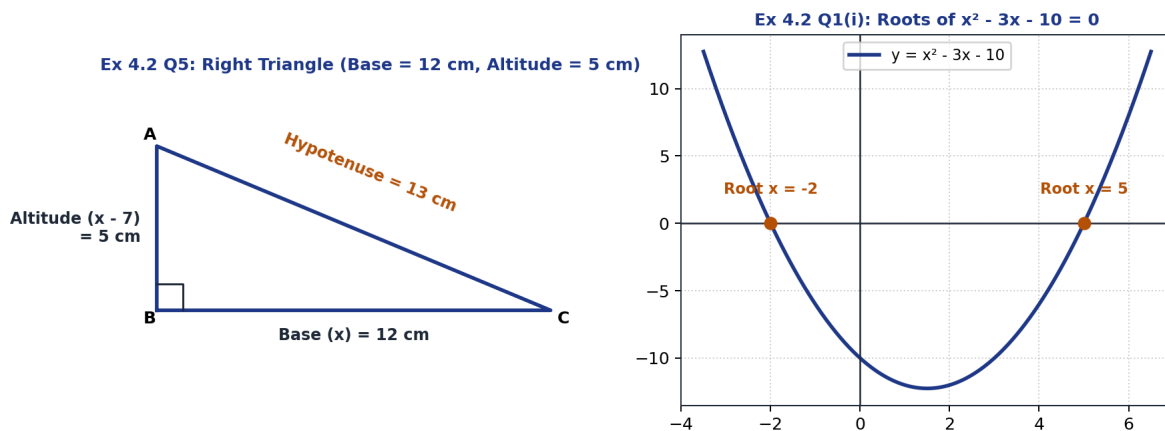


Fig 4.1: Right Triangle Dimensions in Ex 4.2 Q5 (Base = 12 cm, Altitude = 5 cm, Hypotenuse = 13 cm) and Roots of $x^2 - 3x - 10 = 0$ — TYBA Coaching Centre

Section 2: Textbook Solved Examples with Step-by-Step Bilingual Solutions

खंड 2: पाठ्यपुस्तक के सभी हल किए गए उदाहरण (विस्तृत चरणबद्ध हल)

Textbook Example 1: Mathematical Representation of Word Problems / उदाहरण 1: समस्याओं का गणितीय निरूपण

[Problem - EN]: (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 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 ₹) was 55 minus the number of toys produced in a day. On a particular day, the total cost was ₹ 750.

[प्रश्न - HI]: (i) जॉन और जीवन्ती दोनों के पास कुल मिलाकर 45 कंचे हैं। दोनों 5-5 कंचे खो देते हैं, और अब उनके पास कंचों की संख्या का गुणनफल 124 है।

(ii) एक कुटीर उद्योग एक दिन में कुछ खिलौने बनाता है। प्रत्येक खिलौने का मूल्य 55 में से एक दिन में बने खिलौनों की संख्या को घटाने से प्राप्त होता है। कुल लागत ₹ 750 थी।

Step-by-Step Solution (English):

- (i) Let John have x marbles. Then Jivanti had $45 - x$ marbles.
After losing 5 marbles each: John has $x - 5$, Jivanti has $45 - x - 5 = 40 - x$.
Product: $(x - 5)(40 - x) = 124 \Rightarrow -x^2 + 45x - 200 = 124 \Rightarrow x^2 - 45x + 324 = 0$.
(ii) Let number of toys = x . Cost of each toy = ₹ $(55 - x)$.
Total cost: $x(55 - x) = 750 \Rightarrow x^2 - 55x + 750 = 0$.

चरणबद्ध हल (हिंदी):

- (i) माना जॉन के कंचे = x , जीवन्ती के कंचे = $45 - x$ ।
5 कंचे खोने के बाद: $(x - 5)(40 - x) = 124 \Rightarrow x^2 - 45x + 324 = 0$ ।
(ii) माना खिलौनों की संख्या = x , प्रत्येक की लागत = $(55 - x)$ ।
कुल लागत: $x(55 - x) = 750 \Rightarrow x^2 - 55x + 750 = 0$ ।

Textbook Example 3: Roots of $2x^2 - 5x + 3 = 0$ by Factorisation / उदाहरण 3: गुणखंडन द्वारा $2x^2 - 5x + 3 = 0$ के मूल

[Problem - EN]: Find the roots of the equation $2x^2 - 5x + 3 = 0$ by factorisation.

[प्रश्न - HI]: गुणखंडन द्वारा समीकरण $2x^2 - 5x + 3 = 0$ के मूल ज्ञात कीजिए।

Step-by-Step Solution (English):

We need two numbers whose sum is -5 and product is $2 \times 3 = 6$. These are -2 and -3 .

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

$$2x(x - 1) - 3(x - 1) = 0$$

$$(x - 1)(2x - 3) = 0$$

$$\text{So, } x - 1 = 0 \text{ or } 2x - 3 = 0 \Rightarrow x = 1 \text{ or } x = 3/2.$$

Therefore, the roots are **1 and 3/2**.

चरणबद्ध हल (हिंदी):

हमें ऐसी दो संख्याएँ चाहिए जिनका योग -5 तथा गुणनफल 6 हो। वे संख्याएँ -2 और -3 हैं।

$$2x^2 - 2x - 3x + 3 = 0 \Rightarrow (x - 1)(2x - 3) = 0$$

$$\text{अतः } x - 1 = 0 \text{ अथवा } 2x - 3 = 0 \Rightarrow x = 1 \text{ या } x = 3/2$$

अतः समीकरण के मूल **1 और 3/2** हैं।

Textbook Example 5: Roots of $3x^2 - 2\sqrt{6}x + 2 = 0$ / उदाहरण 5: $3x^2 - 2\sqrt{6}x + 2 = 0$ के मूल

[Problem - EN]: Find the roots of the quadratic equation $3x^2 - 2\sqrt{6}x + 2 = 0$.

[प्रश्न - HI]: द्विघात समीकरण $3x^2 - 2\sqrt{6}x + 2 = 0$ के मूल ज्ञात कीजिए।

Step-by-Step Solution (English):

$$3x^2 - 2\sqrt{6}x + 2 = 3x^2 - \sqrt{6}x - \sqrt{6}x + 2 = \sqrt{3}x(\sqrt{3}x - \sqrt{2}) - \sqrt{2}(\sqrt{3}x - \sqrt{2}) = (\sqrt{3}x - \sqrt{2})^2.$$

So, the roots are the values of x for which $(\sqrt{3}x - \sqrt{2}) = 0$.

Therefore, the roots are **$\sqrt{2}/\sqrt{3}, \sqrt{2}/\sqrt{3}$ (or $\sqrt{(2/3)}, \sqrt{(2/3)}$).**

चरणबद्ध हल (हिंदी):

मध्य पद को विभक्त करने पर: $(\sqrt{3}x - \sqrt{2})(\sqrt{3}x - \sqrt{2}) = 0$

अतः $\sqrt{3}x - \sqrt{2} = 0 \Rightarrow x = \sqrt{(2/3)}, \sqrt{(2/3)}$ (दो बराबर मूल)।

Textbook Example 7: Discriminant & Nature of Roots of $2x^2 - 4x + 3 = 0$ / उदाहरण 7: $2x^2 - 4x + 3 = 0$ का विविक्तकर एवं मूलों की प्रकृति

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

[प्रश्न - HI]: द्विघात समीकरण $2x^2 - 4x + 3 = 0$ का विविक्तकर ज्ञात कीजिए और फिर मूलों की प्रकृति ज्ञात कीजिए।

Step-by-Step Solution (English):

Comparing with $ax^2 + bx + c = 0$, we have $a = 2$, $b = -4$, $c = 3$.

$$\text{Discriminant } D = b^2 - 4ac = (-4)^2 - 4(2)(3) = 16 - 24 = -8 < 0.$$

Since $D < 0$, the given equation has **no real roots**.

चरणबद्ध हल (हिंदी):

यहाँ $a = 2$, $b = -4$, $c = 3$ ।

$$\text{विविक्तकर } D = b^2 - 4ac = (-4)^2 - 4(2)(3) = 16 - 24 = -8 < 0$$

चूँकि $D < 0$ है, अतः समीकरण के कोई वास्तविक मूल नहीं हैं।

Section 3: Exercise 4.1 Complete Step-by-Step Solutions

खंड 3: प्रश्नावली 4.1 के संपूर्ण चरणबद्ध हल

Exercise 4.1 — Question 1 / प्रश्नावली 4.1 — प्रश्न 1

[EN] Check whether the following are quadratic equations: (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) $(2x - 1)(x - 3) = (x + 5)(x - 1)$ (vi) $x^2 + 3x + 1 = (x - 2)^2$ (vii) $(x + 2)^3 = 2x(x^2 - 1)$ (viii) $x^3 - 4x^2 - x + 1 = (x - 2)^3$

[HI] जाँच कीजिए कि क्या निम्न द्विघात समीकरण हैं:

- (i) $(x + 1)^2 = 2(x - 3)$: $x^2 + 2x + 1 = 2x - 6 \Rightarrow x^2 + 7 = 0$. Degree is 2 $\Rightarrow$ **Yes (हाँ)**.
- (ii) $x^2 - 2x = (-2)(3 - x)$: $x^2 - 2x = -6 + 2x \Rightarrow x^2 - 4x + 6 = 0$. Degree is 2 $\Rightarrow$ **Yes (हाँ)**.
- (iii) $(x - 2)(x + 1) = (x - 1)(x + 3)$: $x^2 - x - 2 = x^2 + 2x - 3 \Rightarrow 3x - 1 = 0$. Degree is 1 $\Rightarrow$ **No (नहीं)**.
- (iv) $(x - 3)(2x + 1) = x(x + 5)$: $2x^2 - 5x - 3 = x^2 + 5x \Rightarrow x^2 - 10x - 3 = 0$. Degree is 2 $\Rightarrow$ **Yes (हाँ)**.
- (v) $(2x - 1)(x - 3) = (x + 5)(x - 1)$: $2x^2 - 7x + 3 = x^2 + 4x - 5 \Rightarrow x^2 - 11x + 8 = 0$. Degree is 2 $\Rightarrow$ **Yes (हाँ)**.
- (vi) $x^2 + 3x + 1 = (x - 2)^2$: $x^2 + 3x + 1 = x^2 - 4x + 4 \Rightarrow 7x - 3 = 0$. Degree is 1 $\Rightarrow$ **No (नहीं)**.
- (vii) $(x + 2)^3 = 2x(x^2 - 1)$: $x^3 + 6x^2 + 12x + 8 = 2x^3 - 2x \Rightarrow -x^3 + 6x^2 + 14x + 8 = 0$. Degree is 3 (Cubic) $\Rightarrow$ **No (नहीं)**.
- (viii) $x^3 - 4x^2 - x + 1 = (x - 2)^3$: $x^3 - 4x^2 - x + 1 = x^3 - 6x^2 + 12x - 8 \Rightarrow 2x^2 - 13x + 9 = 0$. Degree is 2 $\Rightarrow$ **Yes (हाँ)**.

Final Answer / उत्तर: (i) Yes (ii) Yes (iii) No (iv) Yes (v) Yes (vi) No (vii) No (viii) Yes

Exercise 4.1 — Question 2 / प्रश्नावली 4.1 — प्रश्न 2

[EN] Represent the following situations in the form of quadratic equations:

- (i) Area of rectangular plot is 528 m². Length is 1 m more than twice its breadth.
- (ii) Product of two consecutive positive integers is 306.
- (iii) Rohan's mother is 26 years older than him. Product of ages 3 years from now will be 360.
- (iv) Train travels 480 km at uniform speed; if speed had been 8 km/h less, it takes 3 hours more.

[HI] निम्न स्थितियों को द्विघात समीकरणों के रूप में निरूपित कीजिए:

(i) **Rectangular Plot:** Let breadth = x m. Then length = $(2x + 1)$ m.

$$\text{Area} = x(2x + 1) = 528 \Rightarrow 2x^2 + x - 528 = 0.$$

(ii) **Consecutive Positive Integers:** Let integers be x and $x + 1$.

$$\text{Product} = x(x + 1) = 306 \Rightarrow x^2 + x - 306 = 0.$$

(iii) **Rohan's Age:** Let Rohan's present age = x years, mother's age = $(x + 26)$ years.

$$\text{In 3 years: } (x + 3)(x + 29) = 360 \Rightarrow x^2 + 32x + 87 = 360 \Rightarrow x^2 + 32x - 273 = 0.$$

(iv) **Train Speed:** Let speed = u km/h. Time difference: $480/(u - 8) - 480/u = 3$.

$$480(u - u + 8) = 3u(u - 8) \Rightarrow 480 \times 8 = 3(u^2 - 8u) \Rightarrow u^2 - 8u - 1280 = 0.$$

Final Answer / उत्तर: (i) $2x^2 + x - 528 = 0$ (ii) $x^2 + x - 306 = 0$ (iii) $x^2 + 32x - 273 = 0$ (iv) $u^2 - 8u - 1280 = 0$

Section 4: Exercise 4.2 Complete Step-by-Step Solutions**खंड 4: प्रश्नावली 4.2 के संपूर्ण चरणबद्ध हल****Exercise 4.2 — Question 1 to 6 / प्रश्नावली 4.2 — प्रश्न 1 से 6**

[EN] Q1: Find roots 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) $2x^2 - x + 1/8 = 0$ (v) $100x^2 - 20x + 1 = 0$.

Q2: Solve Example 1 problems.

Q3: Find two numbers whose sum is 27 and product is 182.

Q4: Find two consecutive positive integers whose sum of squares is 365.

Q5: Altitude of right triangle is 7 cm less than base. If hypotenuse is 13 cm, find sides.

Q6: Cottage industry pottery articles problem.

[HI] प्रश्नावली 4.2 के प्रश्न 1 से 6 तक के संपूर्ण हल:

Q1 Solutions (Factorisation):

(i) $x^2 - 5x + 2x - 10 = (x - 5)(x + 2) = 0 \Rightarrow x = -2, 5$.

(ii) $2x^2 + 4x - 3x - 6 = 2x(x + 2) - 3(x + 2) = (x + 2)(2x - 3) = 0 \Rightarrow x = -2, 3/2$.

(iii) $\sqrt{2}x^2 + 2x + 5x + 5\sqrt{2} = \sqrt{2}x(x + \sqrt{2}) + 5(x + \sqrt{2}) = (x + \sqrt{2})(\sqrt{2}x + 5) = 0 \Rightarrow x = -\sqrt{2}, -5/\sqrt{2}$.

(iv) Multiply by 8 $\Rightarrow 16x^2 - 8x + 1 = (4x - 1)^2 = 0 \Rightarrow x = 1/4, 1/4$.

(v) $(10x - 1)^2 = 0 \Rightarrow x = 1/10, 1/10$.

Q2 Solutions:

(i) $x^2 - 45x + 324 = (x - 36)(x - 9) = 0 \Rightarrow 9 \text{ and } 36 \text{ marbles}$.

(ii) $x^2 - 55x + 750 = (x - 25)(x - 30) = 0 \Rightarrow 25 \text{ or } 30 \text{ toys}$.

Q3 Solution (Sum = 27, Product = 182):

$x(27 - x) = 182 \Rightarrow x^2 - 27x + 182 = 0 \Rightarrow (x - 13)(x - 14) = 0 \Rightarrow 13 \text{ and } 14$.

Q4 Solution (Sum of squares = 365):

$x^2 + (x + 1)^2 = 365 \Rightarrow 2x^2 + 2x - 364 = 0 \Rightarrow x^2 + x - 182 = (x + 14)(x - 13) = 0$.

Since integers are positive, $x = 13$. Integers are **13 and 14**.

Q5 Solution (Right Triangle — See Fig 4.1 Left):

Let base = x cm, altitude = $(x - 7)$ cm. By Pythagoras theorem:

$x^2 + (x - 7)^2 = 13^2 \Rightarrow 2x^2 - 14x + 49 = 169 \Rightarrow x^2 - 7x - 60 = 0 \Rightarrow (x - 12)(x + 5) = 0$.

Since side length > 0 , $x = 12$ cm. Thus **Base = 12 cm, Altitude = 5 cm**.

Q6 Solution (Cottage Industry):

Let number of articles = x , cost of each = ₹ $(2x + 3)$.

Total cost: $x(2x + 3) = 90 \Rightarrow 2x^2 + 3x - 90 = 0 \Rightarrow (x - 6)(2x + 15) = 0 \Rightarrow x = 6$.

Hence, **Number of articles = 6, Cost of each article = ₹ 15**.

Final Answer / उत्तर: Q1: (i) $-2, 5$ (ii) $-2, 3/2$ (iii) $-5/\sqrt{2}, -\sqrt{2}$ (iv) $1/4, 1/4$ (v) $1/10, 1/10$ • Q2: 9, 36 and 25, 30 • Q3: 13, 14 • Q4: 13, 14 • Q5: 5 cm and 12 cm • Q6: 6 articles, ₹ 15 each

Section 5: Exercise 4.3 Complete Step-by-Step Solutions**खंड 5: प्रश्नावली 4.3 के संपूर्ण चरणबद्ध हल****Exercise 4.3 — Question 1 to 5 / प्रश्नावली 4.3 — प्रश्न 1 से 5**

[EN] Q1: Nature of roots & find them: (i) $2x^2 - 3x + 5 = 0$ (ii) $3x^2 - 4\sqrt{3}x + 4 = 0$ (iii) $2x^2 - 6x + 3 = 0$.

Q2: Find k for equal roots: (i) $2x^2 + kx + 3 = 0$ (ii) $kx(x - 2) + 6 = 0$.

Q3: Is it possible to design rectangular mango grove with length twice breadth, area 800 m²?

Q4: Sum of ages of two friends is 20 yrs; 4 yrs ago product was 48. Possible?

Q5: Is it possible to design rectangular park of perimeter 80 m, area 400 m²?

[HI] प्रश्नावली 4.3 के प्रश्न 1 से 5 तक के संपूर्ण हल:

Q1 Solutions (Nature of Roots):

(i) $2x^2 - 3x + 5 = 0$: $D = (-3)^2 - 4(2)(5) = 9 - 40 = -31 < 0 \Rightarrow$ **Real roots do not exist (कोई वास्तविक मूल नहीं).**

(ii) $3x^2 - 4\sqrt{3}x + 4 = 0$: $D = (-4\sqrt{3})^2 - 4(3)(4) = 48 - 48 = 0 \Rightarrow$ **Equal real roots: $2/\sqrt{3}, 2/\sqrt{3}$.**

(iii) $2x^2 - 6x + 3 = 0$: $D = 36 - 24 = 12 > 0 \Rightarrow$ **Distinct real roots: $(3 \pm \sqrt{3}) / 2$.**

Q2 Solutions (Equal Roots $D = 0$):

(i) $2x^2 + kx + 3 = 0 \Rightarrow k^2 - 4(2)(3) = 0 \Rightarrow k^2 = 24 \Rightarrow k = \pm 2\sqrt{6}$.

(ii) $kx^2 - 2kx + 6 = 0 \Rightarrow (-2k)^2 - 4(k)(6) = 0 \Rightarrow 4k(k - 6) = 0$. Since $k \neq 0$, **$k = 6$.**

Q3 Solution (Mango Grove):

Let breadth = x m, length = $2x$ m. Area = $2x^2 = 800 \Rightarrow x^2 = 400 \Rightarrow x = 20$ m.

Yes, possible! Length = 40 m, Breadth = 20 m.

Q4 Solution (Ages of Two Friends):

Let ages be x and $(20 - x)$. 4 yrs ago: $(x - 4)(16 - x) = 48 \Rightarrow x^2 - 20x + 112 = 0$.

$D = 400 - 4(112) = 400 - 448 = -48 < 0$. Since $D < 0$, **No, not possible (यह स्थिति संभव नहीं है).**

Q5 Solution (Rectangular Park):

Perimeter = $2(l + b) = 80 \Rightarrow l + b = 40 \Rightarrow b = 40 - l$. Area: $l(40 - l) = 400 \Rightarrow l^2 - 40l + 400 = 0 \Rightarrow (l - 20)^2 = 0$.

$D = 0$, so **Yes, possible! Length = 20 m, Breadth = 20 m** (a square park).

Final Answer / उत्तर: Q1: (i) No real roots (ii) $2/\sqrt{3}, 2/\sqrt{3}$ (iii) $(3 \pm \sqrt{3})/2$ • Q2: (i) $\pm 2\sqrt{6}$ (ii) 6 • Q3: Yes (40 m, 20 m) • Q4: No • Q5: Yes (20 m, 20 m)

Section 6: Chapter Summary & Key Formulas

खंड 6: अध्याय सारांश एवं प्रमुख सूत्र

Concept	Mathematical Formula	विवरण (हिंदी)
Quadratic Formula	$x = [-b \pm \sqrt{b^2 - 4ac}] / (2a)$	द्विघात समीकरण के मूल ज्ञात करने का सूत्र
Discriminant	$D = b^2 - 4ac$	$D > 0$ (भिन्न मूल), $D = 0$ (बराबर मूल), $D < 0$ (काल्पनिक)

© TYBA Coaching Centre (टी वाई बी ए कोचिंग सेंटर) — All Rights Reserved. For Admissions, Regular Batch Coaching & Doubt Clearing Sessions, Contact: **6367029449**.