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कक्षा – 10

गणित

अध्याय – 4

द्विघात समीकरण

भाग – 9

प्रश्नावली 4.3 (प्रश्न 1 व 2)

केशव शर्मा

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प्रश्नावली 4.3

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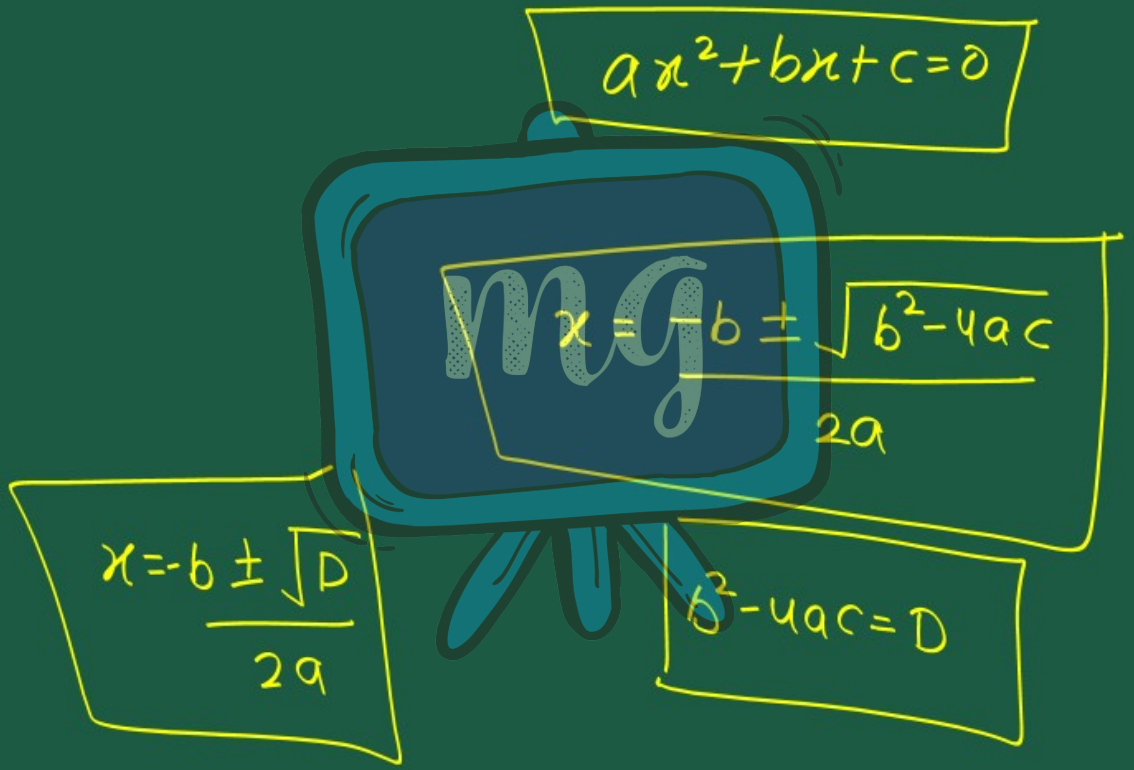

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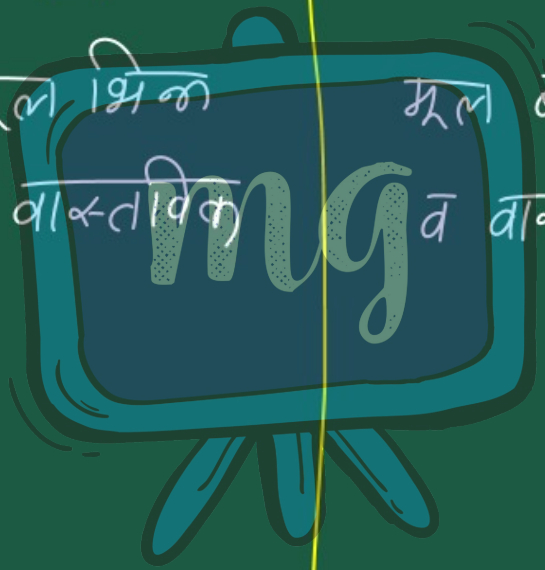
$D = b^2 - 4ac$

$D > 0$	$D = 0$	$D < 0$
मूल भिन्न व वास्तविक	मूल बराबर व वास्तविक	मूल काल्पनिक होंगे।



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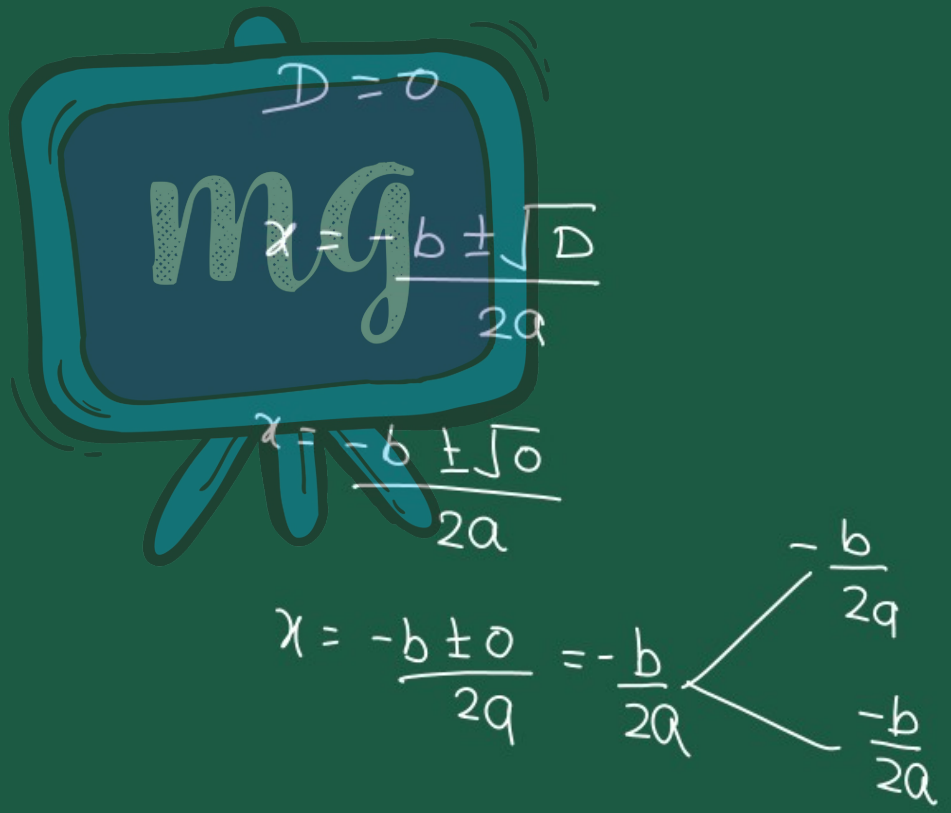

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1. निम्न द्विघात समीकरणों के मूलों की प्रकृति ज्ञात कीजिए। यदि मूलों का अस्तित्व हो तो उन्हें ज्ञात कीजिए :

(i) $2x^2 - 3x + 5 = 0$

हल :-

$2x^2 - 3x + 5 = 0$

$a = 2,\ b = -3,\ c = 5$

$D = b^2 - 4ac$

$D = (-3)^2 - 4 \times 2 \times 5$

$D = 9 - 40 = -31 < 0$

$\because D < 0$

$\therefore$ मूलों का अस्तित्व नहीं है।

मूल काल्पनिक है।

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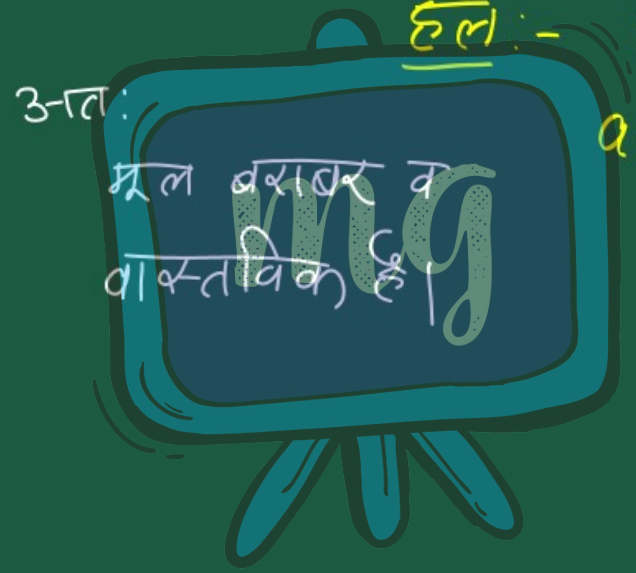
(ii) $3x^2 - 4\sqrt{3}x + 4 = 0$



हल :- $3x^2 - 4\sqrt{3}x + 4 = 0$

$a = 3,\ b = -4\sqrt{3},\ c = 4$

$D = b^2 - 4ac$

$D = (-4\sqrt{3})^2 - 4 \times 3 \times 4$

$D = 16 \times 3 - 12 \times 4$

$D = 48 - 48 = 0$

$D = 0$

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$D = 0$

तो मूल $-\frac{b}{2a}$ व $-\frac{b}{2a}$ होंगे।

$3x^2 - 4\sqrt{3}x + 4 = 0$ के मूल

$\frac{-(-4\sqrt{3})}{2 \times 3}$, $\frac{-(-4\sqrt{3})}{2 \times 3}$

$\frac{2\sqrt{3}}{3}$, $\frac{2\sqrt{3}}{3}$

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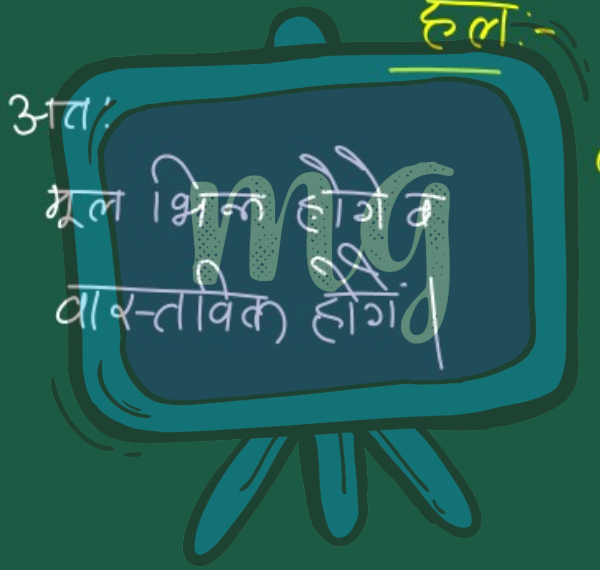
(iii) $2x^2 - 6x + 3 = 0$



हल :-

$2x^2 - 6x + 3 = 0$

$a = 2, b = -6, c = 3$

$D = b^2 - 4ac$

$= (-6)^2 - 4 \times 2 \times 3$

$= 36 - 24$

$D = 12 > 0$

$D > 0$

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द्विघात सूत्र

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

$$x = \frac{-(-6) \pm \sqrt{12}}{2 \times 2}$$

$$x = \frac{6 \pm \sqrt{4 \times 3}}{4}$$

$$x = \frac{6 \pm 2\sqrt{3}}{4} = \frac{2(3 \pm \sqrt{3})}{4}$$

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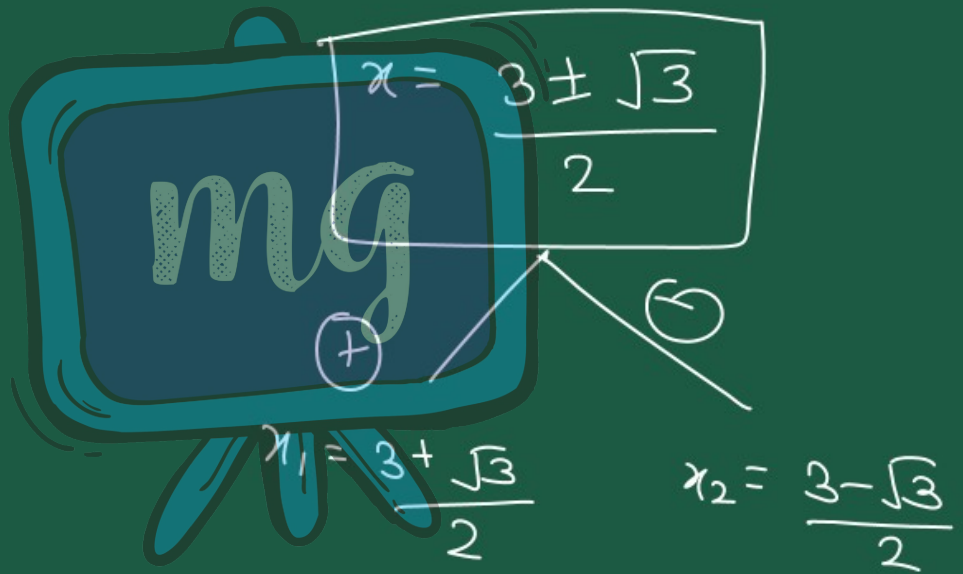

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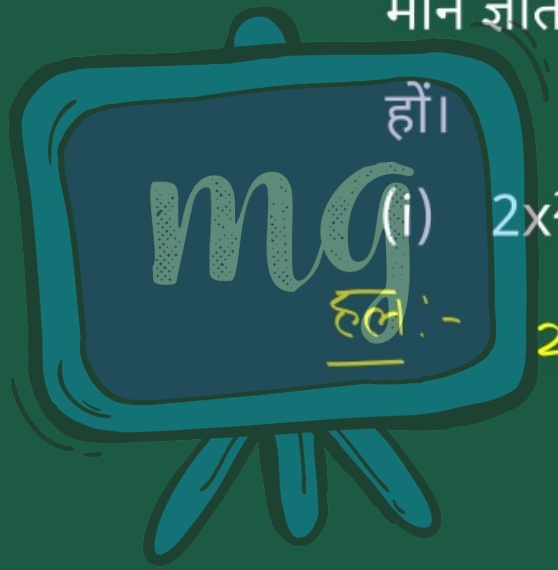
2. निम्न प्रत्येक द्विघात समीकरण में k का ऐसा मान ज्ञात कीजिए कि उसके दो बराबर मूल हों।



(i) $2x^2 + kx + 3 = 0$

हल :-

$2x^2+kx+3=0$ के मूल बराबर होंगे यदि $D=0$

$b^2-4ac=0$

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$2x^2+kx+3=0$ के लिए

$a=2,\ b=k,\ c=3$

$b^2-4ac=0$

$k^2-4\times2\times3=0$

$k^2-24=0$

$k^2=24$

$k=\pm\sqrt{24}$

$k=\pm\sqrt{6\times4}=\pm2\sqrt{6}$

अतः

$k=\pm2\sqrt{6}$

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(ii) $kx(x-2)+6=0$

हल :-

$kx^2-2kx+6=0$ के मूल बराबर होंगे यदि $D=0$

$b^2-4ac=0$

$kx^2-2kx+6=0$ के लिए

$a=k,\ b=-2k,\ c=6$

$b^2-4ac=0$

$(-2k)^2-4\times k\times 6=0$

$4k^2-24k=0$

$4k(k-6)=0$

$4k=0$ | $k-6=0$

$k=0$ | $k=6$



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