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कक्षा – 10

गणित

अध्याय – 4

द्विघात समीकरण

भाग – 5

प्रश्नावली 4.2 (1 से 2)

केशव शर्मा

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प्रश्नावली 4.2

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1. गुणनखंड विधि से निम्न द्विघात समीकरणों के मूल ज्ञात कीजिए :

(i) $x^2 - 3x - 10 = 0$

$1 \times -10 = -10$

-5×2

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

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

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

$-5 + 2 = -3$

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

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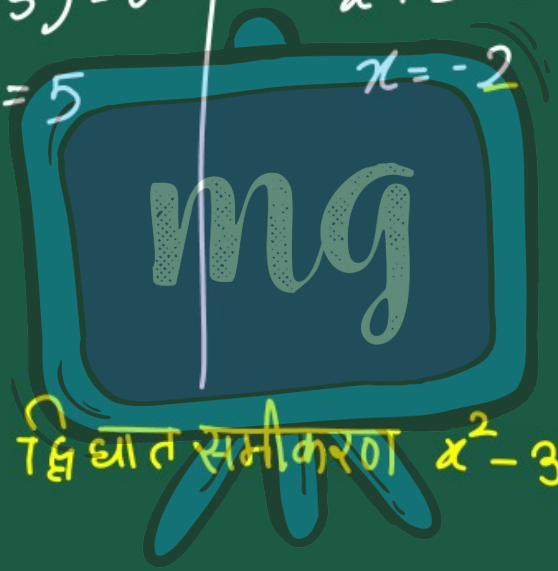
$(x-5)=0$ | $x+2=0$

$x=5$ | $x=-2$



द्विघात समीकरण $x^2-3x-10=0$ के मूल 5, -2 हैं।

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

$2x - 6 = -12$

$4 \quad -3$

$x = 4x - 3x$

$2x^2 + 4x - 3x - 6 = 0$ (3×2)

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

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

$x + 2 = 0$

$x = -2$

$2x - 3 = 0$

$2x = 3$

$x = \frac{3}{2}$

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अतः $2x^2+x-6=0$ के मूल $-2, \frac{3}{2}$ हैं।



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(iii) $\sqrt{2}x^2 + 7x + 5\sqrt{2} = 0$

$\sqrt{2} \times \sqrt{2} = 2$

$\sqrt{2} \times 5\sqrt{2} = 5 \times 2 = 10$

5 2

$\sqrt{2}x^2 + 2x + 5x + 5\sqrt{2} = 0$

$7x = 2x + 5x$

$\sqrt{2}x^2 + (\sqrt{2} \times \sqrt{2})x + 5x + 5\sqrt{2} = 0$

$\sqrt{2}x(x + \sqrt{2}) + 5(x + \sqrt{2}) = 0$

$(x + \sqrt{2})(\sqrt{2}x + 5) = 0$

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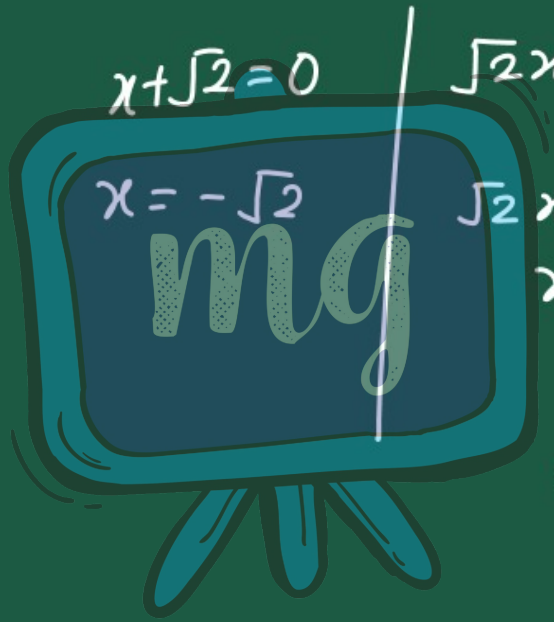

$x + \sqrt{2} = 0$

$x = -\sqrt{2}$

$\sqrt{2}x + 5 = 0$

$\sqrt{2}x = -5$

$x = -\frac{5}{\sqrt{2}}$

$x = -\frac{5}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = -\frac{5\sqrt{2}}{2}$

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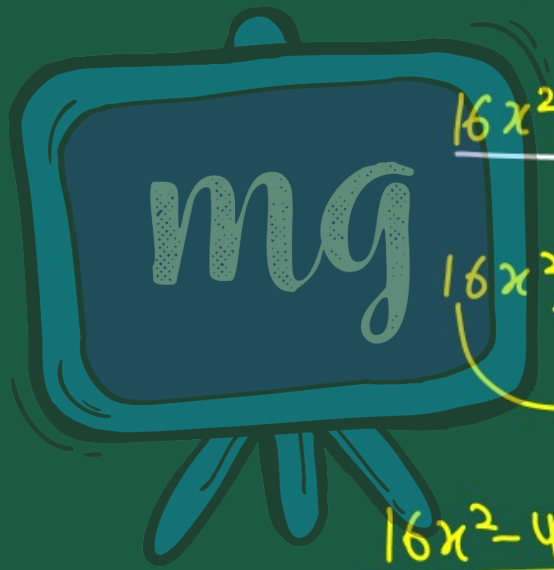
$-4+(-4)=-8$

(iv) $\underset{1}{2x^2} - \underset{1}{x} + \frac{1}{8} = 0$



$$\frac{16x^2-8x+1}{8}=0$$

$$16x^2-8x+1=0$$

$16 \times 1 = 16$

$-4 \quad -4$

$$16x^2-4x-4x+1=0$$

$$4x(4x-1)-1(4x-1)=0$$

$$(4x-1)(4x-1)=0$$

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$4x-1=0$ | $4x-1=0$

$4x=1$ | $4x=1$

$x=\frac{1}{4}$ | $x=\frac{1}{4}$

अतः $2x^2-x+\frac{1}{8}=0$ के मूल $\frac{1}{4}, \frac{1}{4}$ हैं।

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(v) $100x^2 - 20x + 1 = 0$

$100 \times 1 = 100$

$-10 \quad -10$

$-20x = -10x - 10x$

$100x^2 - 10x - 10x + 1 = 0$

$10x(10x - 1) - 1(10x - 1) = 0$

$(10x - 1)(10x - 1) = 0$

$10x - 1 = 0$ | $10x - 1 = 0$

$10x = 1$ | $10x = 1$

$x = \frac{1}{10}$ ✓ | $x = \frac{1}{10}$ ✓

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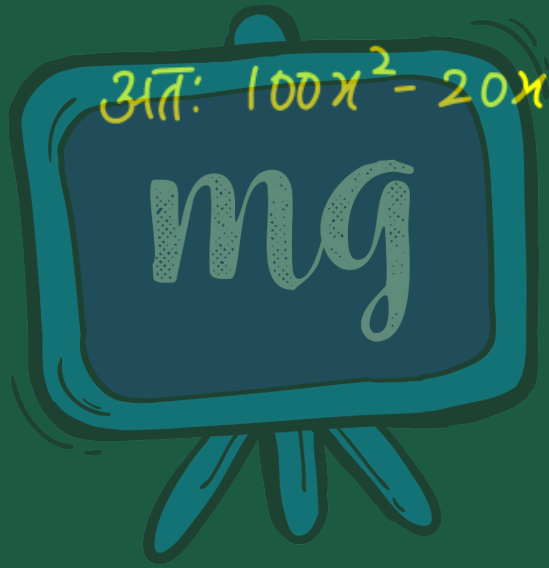

अत: $100x^2 - 20x + 1 = 0$ के मूल $\frac{1}{10}$ और $\frac{1}{10}$ हैं।

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$a^2 - 2ab + b^2 = (a-b)^2$

$100x^2 - 20x + 1 = 0$

$(10x)^2 - 2 \times 10x \times 1 + 1^2 = 0$

$(10x-1)^2 = 0$

$(10x-1)(10x-1) = 0$

$10x-1=0$	$10x-1=0$
$x = -\frac{1}{10}$	$x = \frac{1}{10}$