समग्र शिक्षा
Samagra Shiksha
সমগ্ৰ শিক্ষা

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নৱম শ্ৰেণীৰ বাবে

গণিত

অধ্যায় -১

সংখ্যা প্ৰণালী

অংশ – ৭

অনুশীলনী ১.৫

মালা কুমাৰী শৰ্মা

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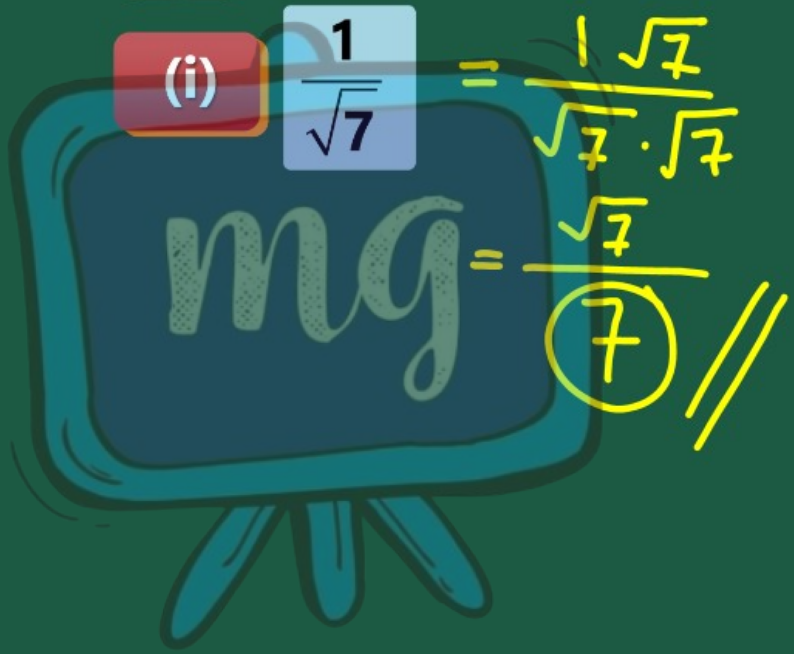
5. তলৰ ৰাশিৰ হৰ বিলাক পৰিমেয় কৰা।

(i) $\frac{1}{\sqrt{7}} = \frac{1}{\sqrt{7}} \times \frac{\sqrt{7}}{\sqrt{7}}$

$= \frac{\sqrt{7}}{7}$ //



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5. তলৰ ৰাশিৰ হৰ বিলাক পৰিমেয় কৰা।

(ii) $\dfrac{1}{\sqrt{7}-\sqrt{6}}$

$= \dfrac{1 \times (\sqrt{7}+\sqrt{6})}{(\sqrt{7}-\sqrt{6})(\sqrt{7}+\sqrt{6})}$

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

$= \dfrac{\sqrt{7}+\sqrt{6}}{(\sqrt{7})^2-(\sqrt{6})^2}$

$= \dfrac{\sqrt{7}+\sqrt{6}}{7-6}$

$= \dfrac{\sqrt{7}+\sqrt{6}}{1} = \sqrt{7}+\sqrt{6}$ //

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5. তলৰ ৰাশিৰ হৰ বিলাক পৰিমেয় কৰা।

(iii) $\dfrac{1}{\sqrt{5}+\sqrt{2}}$

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

$= \dfrac{1}{(\sqrt{5}+\sqrt{2})} \times \dfrac{(\sqrt{5}-\sqrt{2})}{(\sqrt{5}-\sqrt{2})}$

$= \dfrac{\sqrt{5}-\sqrt{2}}{(\sqrt{5})^2-(\sqrt{2})^2}$

$= \dfrac{\sqrt{5}-\sqrt{2}}{5-2}$

$= \dfrac{\sqrt{5}-\sqrt{2}}{3}$

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(iv) $\frac{1}{\sqrt{7}-2}$

$= \frac{1 \times (\sqrt{7}+2)}{(\sqrt{7}-2)(\sqrt{7}+2)}$

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

$= \frac{\sqrt{7}+2}{(\sqrt{7})^2-2^2}$

$= \frac{\sqrt{7}+2}{7-4}$

$= \frac{\sqrt{7}+2}{3}$ //

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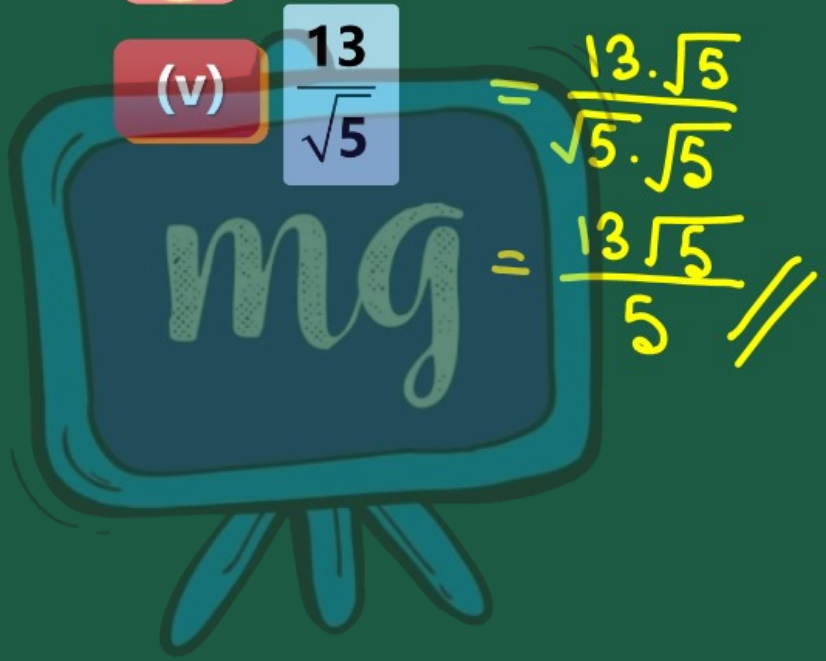
5. তলৰ ৰাশিৰ হৰ বিলাক পৰিমেয় কৰা।

(v) $\frac{13}{\sqrt{5}} = \frac{13 \cdot \sqrt{5}}{\sqrt{5} \cdot \sqrt{5}} = \frac{13\sqrt{5}}{5}$ //



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5. তলৰ ৰাশিৰ হৰ বিলাক পৰিমেয় কৰা।

(vi) $\dfrac{6+\sqrt{5}}{6-\sqrt{5}}$

$= \dfrac{(6+\sqrt{5})(6+\sqrt{5})}{(6-\sqrt{5})(6+\sqrt{5})}$

$= \dfrac{(6+\sqrt{5})^2}{6^2-(\sqrt{5})^2}$

$= \dfrac{6^2+2\cdot 6\cdot\sqrt{5}+(\sqrt{5})^2}{36-5}$

$= \dfrac{36+12\sqrt{5}+5}{31} = \boxed{\dfrac{41+12\sqrt{5}}{31}}$

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

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

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5. তলৰ ৰাশিৰ হৰ বিলাক পৰিমেয় কৰা।

(vii) $\dfrac{5+\sqrt{3}}{3+\sqrt{6}}$

$= \dfrac{(5+\sqrt{3})(3-\sqrt{6})}{(3+\sqrt{6})(3-\sqrt{6})}$

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

$= \dfrac{5(3-\sqrt{6})+\sqrt{3}(3-\sqrt{6})}{3^2-(\sqrt{6})^2}$

$= \dfrac{15-5\sqrt{6}+3\sqrt{3}-\sqrt{3}.\sqrt{6}}{9-6}$

$= \dfrac{15-5\sqrt{6}+3\sqrt{3}-\sqrt{18}}{3}$ //

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5. তলৰ ৰাশিৰ হৰ বিলাক পৰিমেয় কৰা।

(viii) $\dfrac{2\sqrt{3}-3\sqrt{2}}{3\sqrt{2}+2\sqrt{3}}$

$= \dfrac{2\sqrt{3}-3\sqrt{2}}{2\sqrt{3}+3\sqrt{2}}$

$= \dfrac{(2\sqrt{3}-3\sqrt{2})(2\sqrt{3}-3\sqrt{2})}{(2\sqrt{3}+3\sqrt{2})(2\sqrt{3}-3\sqrt{2})}$

$= \dfrac{(2\sqrt{3}-3\sqrt{2})^2}{(2\sqrt{3})^2-(3\sqrt{2})^2}$

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

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

$= \dfrac{(2\sqrt{3})^2-2\cdot 2\sqrt{3}\cdot 3\sqrt{2}+(3\sqrt{2})^2}{4\times 3-9\times 2}$

$= \dfrac{4\times 3-12\sqrt{6}+9\times 2}{12-18} = \dfrac{12-12\sqrt{6}+18}{-6}$

$= \dfrac{30-12\sqrt{6}}{-6}$

$= \dfrac{-6(2\sqrt{6}-5)}{-6} = 2\sqrt{6}-5$ ///

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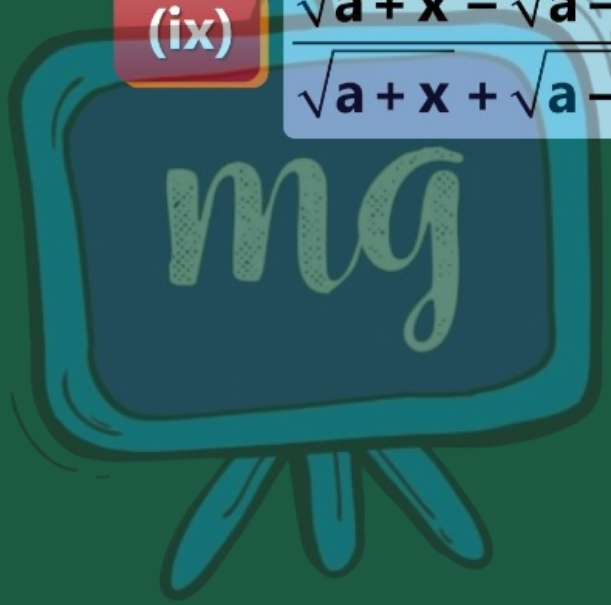
5. তলৰ ৰাশিৰ হৰ বিলাক পৰিমেয় কৰা।

(ix) $\dfrac{\sqrt{a+x}-\sqrt{a-x}}{\sqrt{a+x}+\sqrt{a-x}}$



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$$\frac{\sqrt{a+x}-\sqrt{a-x}}{\sqrt{a+x}+\sqrt{a-x}}$$

$\sqrt{a+x}$: a, $\sqrt{a-x}$: b

$$= \frac{(\sqrt{a+x}-\sqrt{a-x})(\sqrt{a+x}-\sqrt{a-x})}{(\frac{\sqrt{a+x}}{a}+\frac{\sqrt{a-x}}{b})(\sqrt{a+x}-\sqrt{a-x})}$$

$$= \frac{(\sqrt{a+x}-\sqrt{a-x})^2}{(\sqrt{a+x})^2-(\sqrt{a-x})^2}$$

$$= \frac{(\sqrt{a+x})^2-2\cdot\sqrt{a+x}\cdot\sqrt{a-x}+(\sqrt{a-x})^2}{a+x-(a-x)}$$

$$= \frac{a+x-2\sqrt{a^2-x^2}+a-x}{a+x-a+x}$$

$$= \frac{2a-2\sqrt{a^2-x^2}}{2x} = \frac{2(a-\sqrt{a^2-x^2})}{2x} = \frac{a-\sqrt{a^2-x^2}}{x}$$

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

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

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6.

(i) যদি $x = 1 + \sqrt{2}$ তেন্তে দেখুওৱা যে —

$$\left(x - \frac{1}{x}\right)^3 = 8$$

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$x = 1+\sqrt{2}$

R.H.S = 8

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

$$L.H.S = \left(x - \frac{1}{x}\right)^3$$

$$= \left[1+\sqrt{2} - \frac{1}{1+\sqrt{2}}\right]^3$$

$$= \left[\frac{(1+\sqrt{2})(1+\sqrt{2}) - 1}{1+\sqrt{2}}\right]^3$$

$$= \left[\frac{(1+\sqrt{2})^2 - 1^2}{1+\sqrt{2}}\right]^3$$

$$= \left[\frac{(1+\sqrt{2}+1)(1+\sqrt{2}-1)}{1+\sqrt{2}}\right]^3$$

$$= \left[\frac{(2+\sqrt{2})\sqrt{2}}{1+\sqrt{2}}\right]^3$$

$$= \left[\frac{(\sqrt{2}\cdot\sqrt{2}+\sqrt{2})\sqrt{2}}{1+\sqrt{2}}\right]^3$$

$$= \left[\frac{(1+\sqrt{2})\sqrt{2}\cdot\sqrt{2}}{(1+\sqrt{2})_1}\right]^3 = \left(\frac{\sqrt{2}\cdot\sqrt{2}}{1}\right)^3$$

$= 2^3 = 8 = R.H.S$

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6.

(ii) সৰল কৰা :

$$\frac{1}{1+\sqrt{2}}+\frac{1}{\sqrt{2}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{4}}$$

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$$\frac{1}{1+\sqrt{2}} + \frac{1}{\sqrt{2}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{4}}$$

$$= \frac{1(1-\sqrt{2})}{(1+\sqrt{2})(1-\sqrt{2})} + \frac{1(\sqrt{2}-\sqrt{3})}{(\sqrt{2}+\sqrt{3})(\sqrt{2}-\sqrt{3})} + \frac{1(\sqrt{3}-\sqrt{4})}{(\sqrt{3}+\sqrt{4})(\sqrt{3}-\sqrt{4})}$$

$$= \frac{1-\sqrt{2}}{1^2-(\sqrt{2})^2} + \frac{\sqrt{2}-\sqrt{3}}{(\sqrt{2})^2-(\sqrt{3})^2} + \frac{\sqrt{3}-\sqrt{4}}{(\sqrt{3})^2-(\sqrt{4})^2}$$

$$= \frac{1-\sqrt{2}}{1-2} + \frac{\sqrt{2}-\sqrt{3}}{2-3} + \frac{\sqrt{3}-\sqrt{4}}{3-4}$$

$$= \frac{1-\sqrt{2}}{-1} + \frac{\sqrt{2}-\sqrt{3}}{-1} + \frac{\sqrt{3}-\sqrt{4}}{-1}$$

$$= -(1-\sqrt{2}) - (\sqrt{2}-\sqrt{3}) - (\sqrt{3}-\sqrt{4})$$

$$= -1+\cancel{\sqrt{2}}-\cancel{\sqrt{2}}+\cancel{\sqrt{3}}-\cancel{\sqrt{3}}+\sqrt{4}$$

$$= \sqrt{4}-1$$

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

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6.

(iii) $1.2\overline{7}$ আৰু $0.1\overline{3}$ পৰিমেয় সংখ্যা দুটা যোগ কৰা।

$1.2\overline{7} = 1.2777777\ldots$

$+ \quad 0.1\overline{3} = 0.1333333\ldots$

1.4111110

$1.4\overline{1}$