অনুশীলনী ৫.২

১। $\frac{a}{x}, \frac{b}{y}, \frac{c}{z}, \frac{p}{q}$ কে সাধারণ হরবিশিষ্ট করলে নিচের কোনটি সঠিক?

(ক) $\frac{ayzq}{xyzq}, \frac{bxzq}{xyzq}, \frac{cxyq}{xyzq}, \frac{pxyz}{xyzq}$ (খ) $\frac{axy}{xyzq}, \frac{byz}{xyzq}, \frac{czx}{xyzq}, \frac{pxy}{xyzq}$

(গ) $\frac{a}{xyzq}, \frac{b}{xyzq}, \frac{c}{xyzq}, \frac{p}{xyzq}$ (ঘ) $\frac{axyzq}{xyzq}, \frac{bxzq}{xyzq}, \frac{cxyq}{xyzq}, \frac{pxyzq}{xyzq}$

২। $\frac{x^2y^2}{ab}$ ও $\frac{c^3d^2}{x^5y^3}$ এর গুণফল কত হবে?

(ক) $\frac{x^2y^2c^3d^2}{abx^3y^2}$ (খ) $\frac{c^3d^2}{abx^3y}$ (গ) $\frac{x^2y^2c^3}{x^3y}$ (ঘ) $\frac{xyd^3}{ab}$

৩। $\frac{x^2-2x+1}{a^2-2a+1}$ ও $\frac{x-1}{a-1}$ দ্বারা ভাগ করলে ভাগফল কত হবে?

(ক) $\frac{x+1}{a-1}$ (খ) $\frac{x-1}{a-1}$ (গ) $\frac{x-1}{a+1}$ (ঘ) $\frac{x-1}{a-1}$

৪। $\frac{a^2-b^2}{(a+b)^2} \div \frac{(a+b)^2-4ab}{a^3+b^3} \times \frac{a+b}{a^2-ab+b^2}$ এর সরলকৃত মান কত হবে?

(ক) $\frac{a-b}{a+b}$ (খ) $\frac{a+b}{a-b}$ (গ) $(a-b)$ (ঘ) $(a+b)$

৫। নিচের বাম দিকের তথ্যের সাথে ডানদিকের তথ্যের মিল কর :

(ক) সাধারণ হরবিশিষ্ট ভগ্নাংশের হর	(ক) $x-y$
(খ) $\frac{(x+y)^2}{x^2-y^2} \times \frac{(x-y)^2}{(x+y)}$	(খ) 1
(গ) $\frac{x^2-y^2}{x+y} \div \frac{x-y}{(x+y)} \times \frac{1}{x+y}$	(গ) হরগুলোর ল.সা.গু.
(ঘ) $\frac{(x+y)^2}{x-y} \div \frac{x-y}{x+y} \times \frac{(x-y)^3}{x^2-y^2}$	(ঘ) $(x+y)^2$

সমাধান :

(ক) সাধারণ হরবিশিষ্ট ভগ্নাংশের হর ⟶ (গ) হরগুলোর ল.সা.গু.

(খ) $\frac{(x+y)^2}{x^2-y^2}\times\frac{(x-y)^2}{(x+y)}$ ⟶ (ক) $x-y$

(গ) $\frac{x^2-y^2}{x+y}\div\frac{x-y}{(x+y)}\times\frac{1}{x+y}$ ⟶ (খ) 1

(ঘ) $\frac{(x+y)^2}{x-y}\div\frac{x-y}{x+y}\times\frac{(x-y)^3}{x^2-y^2}$ ⟶ (ঘ) $(x+y)^2$

৬। গুণ কর :

(ক) $\frac{9x^2y^2}{7y^2z^2},\frac{5b^2c^2}{7z^2x^2}$ এবং $\frac{7c^2a^2}{x^2y^2}$

(খ) $\frac{16a^2b^2}{21z^2},\frac{28z^4}{9x^3y^4}$ এবং $\frac{3y^7z}{10x}$

(গ) $\frac{yz}{x^2},\frac{xz}{y^2}$ এবং $\frac{xy}{z^2}$

(ঘ) $\frac{x-1}{x+1},\frac{(x-1)^2}{x^2+x}$ এবং $\frac{x^2}{x^2-4x+5}$

(ঙ) $\frac{x^4-y^4}{x^2-2xy+y^2},\frac{x-y}{x^3+y^3}$ এবং $\frac{x+y}{x^3+y^3}$

(চ) $\frac{1-b^2}{1+x},\frac{1-x^2}{b+b^2}$ এবং $1+\frac{1-x}{x}$

(ছ) $\frac{x^2-3x+2}{x^2-4x+3},\frac{x^2-5x+6}{x^2-7x+12}$ এবং $\frac{x^2-16}{x^2-9}$

(জ) $\frac{x^3+y^3}{a^2b+ab^2+b^3},\frac{a^3-b^3}{x^2-xy+y^2}$ এবং $\frac{ab}{x+y}$

(ঝ) $\frac{x^3+y^3+3xy(x+y)}{(a+b)^3},\frac{a^3+b^3+3ab(a+b)}{x^2-y^2}$ এবং $\frac{(x-y)^2}{(x+y)^2}$

(ক) $\frac{9x^2y^2}{7y^2z^2}, \frac{5b^2c^2}{3z^2x^2}$ এবং $\frac{7c^2a^2}{x^2y^2}$

সমাধান :

$\frac{9x^2y^2}{7y^2z^2}, \frac{5b^2c^2}{3z^2x^2}$ এবং $\frac{7c^2a^2}{x^2y^2}$ এর গুণফল

$= \frac{9x^2y^2}{7y^2z^2} \times \frac{5b^2c^2}{3z^2x^2} \times \frac{7c^2a^2}{x^2y^2}$

$= \frac{15a^2b^2c^4}{x^2y^2z^4}$

নির্ণেয় গুণফল $\frac{15a^2b^2c^4}{x^2y^2z^4}$

(গ) $\frac{yz}{x^2}, \frac{xz}{y^2}$ এবং $\frac{xy}{z^2}$

সমাধান :

$\frac{yz}{x^2}, \frac{xz}{y^2}$ এবং $\frac{xy}{z^2}$ এর গুণফল

$= \frac{yz}{x^2} \times \frac{xz}{y^2} \times \frac{xy}{z^2}$

$= 1$

নির্ণেয় গুণফল 1

(ঙ) $\frac{x^4 - y^4}{x^2 - 2xy + y^2}, \frac{x-y}{x^3+y^3}$ এবং $\frac{x+y}{x^3+y^3}$

সমাধান :

$\frac{x^4-y^4}{x^2-2xy+y^2}, \frac{x-y}{x^3+y^3}$ এবং $\frac{x+y}{x^3+y^3}$ এর গুণফল

$= \frac{(x^2-y^2)(x^2+y^2)(x-y)(x+y)}{(x-y)^2(x+y)(x^2-xy+y^2)(x+y)(x^2-xy+y^2)}$

$= \frac{(x^2+y^2)}{(x^2-xy+y^2)(x^2-xy+y^2)}$

(খ) $\frac{16a^2b^2}{21z^2}, \frac{28z^4}{9x^3y^4}$ এবং $\frac{3y^7z}{10x}$

সমাধান :

$\frac{16a^2b^2}{21z^2}, \frac{28z^4}{9x^3y^4}$ এবং $\frac{3y^7z}{10x}$ এর গুণফল

$= \frac{16a^2b^2}{21z^2} \times \frac{28z^4}{9x^3y^4} \times \frac{3y^7z}{10x}$

$= \frac{32a^2b^2y^3z^3}{45z^4}$

নির্ণেয় গুণফল $\frac{15a^2b^2c^4}{x^2y^2z^4}$

(ঘ) $\frac{x-1}{x+1}, \frac{(x-1)^2}{x^2+x}$ এবং $\frac{x^2}{x^2-4x+5}$

সমাধান :

$\frac{x-1}{x+1}, \frac{(x-1)^2}{x^2+x}$ এবং $\frac{x^2}{x^2-4x+5}$ এর গুণফল

$= \frac{(x-1)}{(x+1)} \times \frac{(x-1)(x-1)}{x(x+1)} \times \frac{x^2}{x^2-4x+5}$

$= \frac{(x-1)(x-1)(x-1)}{(x+1)x(x+1)} \times \frac{x \times x}{(x^2-4x++5)}$

$= \frac{x(x-1)^3}{(x+1)^2(x^2-4x+5)}$

নির্ণেয় গুণফল $\frac{x(x-1)^3}{(x+1)^2(x^2-4x+5)}$

$$= \frac{(x^2+y^2)}{(x^2-xy+y^2)^2}$$

নির্ণেয় গুণফল $\frac{(x^2+y^2)}{(x^2-xy+y^2)^2}$

(চ) $\frac{1-b^2}{1+x}, \frac{1-x^2}{b+b^2}$ এবং $\left(1+\frac{1-x}{x}\right)$

সমাধান :

$\frac{1-b^2}{1+x}, \frac{1-x^2}{b+b^2}$ এবং $\left(1+\frac{1-x}{x}\right)$ এর গুণফল

$$= \frac{1-b^2}{1+x} \times \frac{1-x^2}{b+b^2} \times \left(1+\frac{1-x}{x}\right)$$

$$= \frac{(1-b)(1+b)(1-x)(1+x)}{(1+x)b(1+b)} \times \left(\frac{x+1-x}{x}\right)$$

$$= \frac{(1-b)(1-x)}{bx}$$

$$= \frac{(1-b)(1-x)}{bx}$$

নির্ণেয় গুণফল $\frac{(1-b)(1-x)}{bx}$

(ছ) $\frac{x^2-3x+2}{x^2-4x+3}, \frac{x^2-5x+6}{x^2-7x+12}$ এবং $\frac{x^2-16}{x^2-9}$

সমাধান :

$\frac{x^2-3x+2}{x^2-4x+3}, \frac{x^2-5x+6}{x^2-7x+12}$ এবং $\frac{x^2-16}{x^2-9}$ এর গুণফল

$$= \frac{x^2-3x+2}{x^2-4x+3} \times \frac{x^2-5x+6}{x^2-7x+12} \times \frac{x^2-16}{x^2-9}$$

$$= \frac{x^2-x-2x+2}{x^2-x-3x+3} \times \frac{x^2-2x-3+6}{x^2-3x-4x+12} \times \frac{x^2-4^2}{x^2-3^2}$$

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

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

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

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

নির্ণেয় গুণফল $\frac{(x-2)^2(x+4)}{(x-3)^2(x+3)}$

(জ) $\frac{x^3+y^3}{a^2b+ab^2+b^3}, \frac{a^3-b^3}{x^2-xy+y^2}$ এবং $\frac{ab}{x+y}$

সমাধান :

$\frac{x^3+y^3}{a^2b+ab^2+b^3}, \frac{a^3-b^3}{x^2-xy+y^2}$ এবং $\frac{ab}{x+y}$ এর গুণফল

$$= \frac{(x+y)(x^2-xy+y^2)}{b(a^2+ab+b^2)} \times \frac{(a-b)(a^2+ab+b^2)}{(x^2-xy+y^2)} \times \frac{ab}{(x+y)}$$

$$= \frac{(x+y)(x^2-xy+y^2)(a-b)(a^2+ab+b^2)ab}{b(a^2+ab+b^2)(x^2-xy+y^2)(x+y)}$$

$$= a(a-b)$$

নির্ণেয় গুণফল $a(a-b)$

(ঝ) $\frac{x^3+y^3+3xy(x+y)}{(a+b)^3}, \frac{a^3+b^3+3ab(a+b)}{x^2-y^2}$ এবং $\frac{(x-y)^2}{(x+y)^2}$

সমাধান :

$\frac{x^3+y^3+3xy(x+y)}{(a+b)^3}, \frac{a^3+b^3+3ab(a+b)}{x^2-y^2}$ এবং $\frac{(x-y)^2}{(x+y)^2}$ এর গুণফল

$= \frac{(x+y)^3}{(a+b)^3} \times \frac{(a+b)^3}{(x-y)(x+y)} \times \frac{(x-y)^2}{(x+y)^2}$

$= \frac{(x+y)^3(a+b)^3(x-y)^2}{(a+b)^3(x-y)(x+y)(x+y)^2}$

$= x-y$

নির্ণেয় গুণফল $x-y$

৭। ভাগ কর : (প্রথম রাশিকে ২য় রাশি দ্বারা)

(ক) $\frac{3x^2}{2a}, \frac{4y^2}{15zx}$ (খ) $\frac{9a^2b^2}{4c^2}, \frac{16a^2b}{3c^3}$ (গ) $\frac{21a^4b^4b^4}{4x^3y^3z^3}, \frac{7a^2b^2c^2}{12xyz}$

(ঘ) $\frac{x}{y}, \frac{x+y}{y}$ (ঙ) $\frac{(a+b)^2}{(a-b)^2}, \frac{a^2-b^2}{a+b}$ (চ) $\frac{x^3-y^3}{x+y}, \frac{x^2+xy+y^2}{x^2-y^2}$

(ছ) $\frac{a^3+b^3}{a-b}, \frac{a^2-ab+b^2}{a^2-b^2}$ (জ) $\frac{x^2-7x+12}{x^2-4}, \frac{x^2-16}{x^2-3x+2}$

(ঝ) $\frac{x^2-x-30}{x^2-36}, \frac{x^2+13x+40}{x^2+x-56}$

(ক) $\frac{3x^2}{2a}, \frac{4y^2}{15zx}$

সমাধান :

$\frac{3x^2}{2a} \div \frac{4y^2}{15zx}$

$= \frac{3x^2}{2a} \times \frac{15zx}{4y^2}$

$= \frac{45x^2z}{8ay^2}$ নির্ণেয় ভাগফল $\frac{45x^2z}{8ay^2}$

(খ) $\frac{9a^2b^2}{4c^2}, \frac{16a^2b}{3c^3}$

সমাধান :

$\frac{9a^2b^2}{4c^2} \div \frac{16a^2b}{3c^3}$

$= \frac{9a^2b^2}{4c^2} \times \frac{3c^3}{16a^2b}$

$= \frac{27bc}{64a}$ নির্ণেয় ভাগফল $\frac{27bc}{64a}$

(গ) $\frac{21a^4b^4b^4}{4x^3y^3z^3}, \frac{7a^2b^2c^2}{12xyz}$

সমাধান :

$$\frac{21a^4b^4b^4}{4x^3y^3z^3} \div \frac{7a^2b^2c^2}{12xyz}$$

$$= \frac{21a^4b^4b^4}{4x^3y^3z^3} \times \frac{12xyz}{7a^2b^2c^2}$$

$$= \frac{21a^4b^4b^4 \times 12xyz}{4x^3y^3z^3 \times 7a^2b^2c^2}$$

$$= \frac{9a^2b^2b^2}{x^2y^2z^2}$$

নির্ণেয় ভাগফল $\frac{9a^2b^2b^2}{x^2y^2z^2}$

(ঙ) $\frac{(a+b)^2}{(a-b)^2}, \frac{a^2-b^2}{a+b}$

সমাধান :

$$\frac{(a+b)^2}{(a-b)^2} \div \frac{a^2-b^2}{a+b}$$

$$= \frac{(a+b)^2}{(a-b)^2} \times \frac{a+b}{a^2-b^2}$$

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

$$= \frac{(a+b)^2}{(a-b)^3}$$

নির্ণেয় ভাগফল $\frac{(a+b)^2}{(a-b)^3}$

(ঘ) $\frac{x}{y}, \frac{x+y}{y}$

সমাধান :

$$\frac{x}{y} \div \frac{x+y}{y}$$

$$= \frac{x}{y} \times \frac{y}{x+y}$$

$$= \frac{x}{x+y}$$

নির্ণেয় ভাগফল $\frac{x}{x+y}$

(চ) $\frac{x^3-y^3}{x+y}, \frac{x^2+xy+y^2}{x^2-y^2}$

সমাধান :

$$\frac{x^3-y^3}{x+y} \div \frac{x^2+xy+y^2}{x^2-y^2}$$

$$= \frac{(x-y)(x^2+xy+y^2)}{(x+y)} \times \frac{x^2-y^2}{x^2+xy+y^2}$$

$$= \frac{(x-y)(x^2+xy+y^2)}{(x+y)} \times \frac{(x-y)(x+y)}{(x^2+xy+y^2)}$$

$$= (x-y)(x-y)$$

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

নির্ণেয় ভাগফল $(x-y)^2$

(ছ) $\frac{a^3+b^3}{a-b}, \frac{a^2-ab+b^2}{a^2-b^2}$

সমাধান :

$$\frac{a^3+b^3}{a-b} \div \frac{a^2-ab+b^2}{a^2-b^2}$$
$$= \frac{(a+b)(a^2-ab+b^2)}{(a-b)} \times \frac{(a-b)(a+b)}{(a^2-ab+b^2)}$$
$$= \frac{(a+b)(a^2-ab+b^2)}{(a-b)} \times \frac{(a-b)(a+b)}{(a^2-ab+b^2)}$$
$$= (a+b)(a+b)$$
$$= (a+b)^2$$

নির্ণেয় ভাগফল $(a+b)^2$

(ঝ) $\frac{x^2-x-30}{x^2-36}, \frac{x^2+13x+40}{x^2+x-56}$

সমাধান :

$$\frac{x^2-x-30}{x^2-36} \div \frac{x^2+13x+40}{x^2+x-56}$$
$$= \frac{x^2-6x+5x-30}{x^2-6^2} \times \frac{x^2+8x-7x-56}{x^2+8x+5x+40}$$
$$= \frac{(x-6)(x+5)}{(x-6)(x+6)} \times \frac{(x+8)(x-7)}{(x+8)(x+5)}$$
$$= \frac{(x-7)}{(x+6)}$$

নির্ণেয় ভাগফল $\frac{(x-7)}{(x+6)}$

(জ) $\frac{x^2-7x+12}{x^2-4}, \frac{x^2-16}{x^2-3x+2}$

সমাধান :

$$\frac{x^2-7x+12}{x^2-4} \div \frac{x^2-16}{x^2-3x+2}$$
$$= \frac{x^2-3x-4x+12}{x^2-2^2} \times \frac{x^2-2x-x+2}{x^2-4^2}$$
$$= \frac{(x-3)(x-4)}{(x-2)(x+2)} \times \frac{(x-2)(x-1)}{(x-4)(x+4)}$$
$$= \frac{(x-3)(x-1)}{(x+2)(x+4)}$$
$$= \frac{(x-3)(x-1)}{(x+2)(x+4)}$$

নির্ণেয় ভাগফল $\frac{(x-3)(x-1)}{(x+2)(x+4)}$

৮। সরল কর :

(ক) $\left(\frac{1}{x}+\frac{1}{y}\right)\times\left(\frac{1}{x}-\frac{1}{y}\right)$ (খ) $\left(\frac{1}{1+x}+\frac{2x}{1-x^2}\right)\left(1-\frac{1}{x^2}\right)$

(গ) $\left(1-\frac{c}{a+b}\right)\left(\frac{a}{a+b+c}-\frac{a}{a+b-c}\right)$

(ঘ) $\left(\frac{1}{1+a}+\frac{a}{1-a}\right)\left(\frac{1}{1+a^2}-\frac{1}{1+a+a^2}\right)$

(ঙ) $\left(\frac{x}{2x-y}+\frac{x}{2x+y}\right)\left(4+\frac{3y^2}{x^2-y^2}\right)$

(চ) $\left(\frac{2x+y}{x+y}-1\right)\div\left(1-\frac{y}{x+y}\right)$

(ছ) $\left(\frac{a}{a+b}-\frac{b}{a-b}\right)\div\left(\frac{a}{a-b}-\frac{b}{a+b}\right)$

(জ) $\left(\frac{a^2+b^2}{2ab}-1\right)\div\left(\frac{a^3-b^3}{a-b}-3ab\right)$

(ঝ) $\frac{(x+y)^2-4xy}{(a+b)^2-4ab}\div\frac{x^3-y^3-3xy(x-y)}{a^3-b^3-3ab(a-b)}$

(ঞ) $\left(\frac{a}{b}+\frac{b}{a}+1\right)\div\left(\frac{a^2}{b^2}+\frac{a}{b}+1\right)$

(ক) $\left(\frac{1}{x}+\frac{1}{y}\right)\times\left(\frac{1}{x}-\frac{1}{y}\right)$

সমাধান :

$\left(\frac{1}{x}+\frac{1}{y}\right)\times\left(\frac{1}{x}-\frac{1}{y}\right)$

$=\frac{y+x}{xy}\times\frac{y-x}{xy}$

$=\frac{y^2-x^2}{x^2y^2}$ নির্ণেয় সরলফল $\frac{y^2-x^2}{x^2y^2}$

(খ) $\left(\frac{1}{1+x}+\frac{2x}{1-x^2}\right)\left(\frac{1}{x}-\frac{1}{x^2}\right)$

সমাধান :

$$\left(\frac{1}{1+x}+\frac{2x}{1-x^2}\right)\left(\frac{1}{x}-\frac{1}{x^2}\right)$$
$$=\left\{\frac{1-x+2x}{(1-x)(1+x)}\right\}\left(\frac{x-1}{x^2}\right)$$
$$=\frac{(1+x)}{(1-x)(1+x)}\times\frac{(x-1)}{x^2}$$
$$=\frac{-(1-x)}{(1-x)x^2}$$
$$=-\frac{1}{x^2}$$

নির্ণেয় সরলফল $-\frac{1}{x^2}$

(গ) $\left(1-\frac{c}{a+b}\right)\left(\frac{a}{a+b+c}-\frac{a}{a+b-c}\right)$

সমাধান :

$$\left(1-\frac{c}{a+b}\right)\left(\frac{a}{a+b+c}-\frac{a}{a+b-c}\right)$$
$$=\left(\frac{a+b-c}{a+b}\right)\left\{\frac{a(a+b-c)-a(a+b+c)}{(a+b+c)(a+b-c)}\right\}$$
$$=\frac{(a+b-c)}{a+b}\times\frac{a^2+ab-ca-a^2-ab-ca}{(a+b+c)(a+b-c)}$$
$$=\frac{-2ca}{(a+b)(a+b+c)}$$

নির্ণেয় সরলফল $\frac{-2ca}{(a+b)(a+b+c)}$

(ঘ) $\left(\frac{1}{1+a}+\frac{a}{1-a}\right)\left(\frac{1}{1+a^2}-\frac{1}{1+a+a^2}\right)$

সমাধান :

$$\left(\frac{1}{1+a}+\frac{a}{1-a}\right)\left(\frac{1}{1+a^2}-\frac{1}{1+a+a^2}\right)$$

$$=\frac{1(1-a)+a(1+a)}{(1+a)(1-a)}\times\frac{1(1+a+a^2)-1(1+a^2)}{(1+a^2)(1+a+a^2)}$$

$$=\frac{1-a+a+a^2}{(1+a)(1-a)}\times\frac{1+a+a^2-1-a^2}{(1+a^2)(1+a+a^2)}$$

$$=\frac{1+a^2}{(1+a)(1-a)}\times\frac{a}{(1+a^2)(1+a+a^2)}$$

$$=\frac{a(1+a^2)}{(1+a)(1-a)(1+a^2)(1+a+a^2)}$$

নির্ণেয় সরলফল $\frac{a(1+a^2)}{(1+a)(1-a)(1+a^2)(1+a+a^2)}$

(ঙ) $\left(\frac{x}{2x-y}+\frac{x}{2x+y}\right)\left(4+\frac{3y^2}{x^2-y^2}\right)$

সমাধান :

$$\left(\frac{x}{2x-y}+\frac{x}{2x+y}\right)\left(4+\frac{3y^2}{x^2-y^2}\right)$$

$$=\frac{x(2x+y)+x(2x-y)}{(2x-y)(2x+y)}\times\frac{4(x^2-y^2)+3y^2}{x^2-y^2}$$

$$=\frac{4x^2}{(4x^2-y^2)}\times\frac{(4x^2-y^2)}{(x^2-y^2)}$$

$$=\frac{4x^2}{(x^2-y^2)}$$

নির্ণেয় সরলফল $\frac{4x^2}{(x^2-y^2)}$

(চ) $\left(\frac{2x+y}{x+y}-1\right)\div\left(1-\frac{y}{x+y}\right)$

সমাধান :

$$\left(\frac{2x+y}{x+y}-1\right)\div\left(1-\frac{y}{x+y}\right)$$

$$=\frac{2x+y-1(x+y)}{x+y}\div\frac{1(x+y)-y}{x+y}$$

$$=\frac{2x+y-x-y}{(x+y)}\times\frac{(x+y)}{x+y-y}$$

$$=\frac{x}{1}\times\frac{1}{x}$$

$$=1$$

নির্ণেয় সরলফল 1

(ছ) $\left(\frac{a}{a+b}-\frac{b}{a-b}\right)\div\left(\frac{a}{a-b}-\frac{b}{a+b}\right)$

সমাধান :

$$\left(\frac{a}{a+b}-\frac{b}{a-b}\right)\div\left(\frac{a}{a-b}-\frac{b}{a+b}\right)$$

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

$$=\frac{a^2-ab+ab+b^2}{(a-b)(a+b)}\times\frac{(a-b)(a+b)}{a^2+ab-ab+b^2}$$

$$=\frac{(a^2+b^2)}{(a-b)(a+b)}\times\frac{(a-b)(a+b)}{(a^2+b^2)}$$

$$=\frac{(a^2+b^2)}{(a^2+b^2)}$$

$$=1$$

নির্ণেয় সরলফল 1

(জ) $\left(\frac{a^2+b^2}{2ab}-1\right)\div\left(\frac{a^3-b^3}{a-b}-3ab\right)$

সমাধান :

$$\left(\frac{a^2+b^2}{2ab}-1\right)\div\left(\frac{a^3-b^3}{a-b}-3ab\right)$$

$$=\left(\frac{a^2+b^2-2ab}{2ab}\right)\div\left(\frac{a^3-b^3-3ab(a-b)}{a-b}\right)$$

$$=\frac{(a-b)^2}{2ab}\times\frac{(a-b)}{(a-b)^3}$$

$$=\frac{1}{2ab}$$

নির্ণেয় সরলফল $\frac{1}{2ab}$

(ঝ) $\frac{(x+y)^2-4xy}{(a+b)^2-4ab}\div\frac{x^3-y^3-3xy(x-y)}{a^3-b^3-3ab(a-b)}$

সমাধান :

$$\frac{(x+y)^2-4xy}{(a+b)^2-4ab}\div\frac{x^3-y^3-3xy(x-y)}{a^3-b^3-3ab(a-b)}$$

$$=\frac{(x-y)^2}{(a-b)^2}\div\frac{(x-y)^3}{(a-b)^3}$$ [$\because (a-b)^2=(a+b)^2-4ab$ সূত্র মতে]

$$=\frac{(x-y)^2}{(a-b)^2}\times\frac{(a-b)^3}{(x-y)^3}$$

$$=\frac{a-b}{x-y}$$

নির্ণেয় সরলফল $\frac{a-b}{x-y}$

(ঞ) $\left(\frac{a}{b}+\frac{b}{a}+1\right)\div\left(\frac{a^2}{b^2}+\frac{a}{b}+1\right)$

সমাধান :

$$\left(\frac{a}{b}+\frac{b}{a}+1\right)\div\left(\frac{a^2}{b^2}+\frac{a}{b}+1\right)$$

$$=\left(\frac{a^2+b^2+ab}{ab}\right)\div\left(\frac{a^2+ab+b^2}{b^2}\right)$$

$$=\frac{(a^2+b^2+ab)}{ab}\times\frac{b^2}{(a^2+ab+b^2)}$$

$$=\frac{b}{a}$$

নির্ণেয় সরলফল $\frac{b}{a}$

৯। সরল কর।

(ক) $\frac{x^2+2x-15}{x^2+x-12}\div\frac{x^2-25}{x^2-x-20}\times\frac{x-2}{x^2-5x+6}$

(খ) $\left(\frac{x}{x-y}-\frac{x}{x+y}\right)\div\left(\frac{y}{x-y}-\frac{y}{x+y}\right)+\left(\frac{x+y}{x-y}+\frac{x-y}{x+y}\right)\div\left(\frac{x+y}{x-y}-\frac{x-y}{x+y}\right)$

(গ) $\frac{x^2+2x-3}{x^2+x-2}\div\frac{x^2+x-6}{x^2-4}$

(ঘ) $\frac{a^4-b^4}{a^2+b^2-2ab}\times\frac{(a+b)^2-4ab}{a^3-b^3}\div\frac{a+b}{a^2+ab+b^2}$

(ক) $\frac{x^2+2x-15}{x^2+x-12}\div\frac{x^2-25}{x^2-x-20}\times\frac{x-2}{x^2-5x+6}$

সমাধান :

$$\frac{x^2+2x-15}{x^2+x-12}\div\frac{x^2-25}{x^2-x-20}\times\frac{x-2}{x^2-5x+6}$$

$$= \frac{x^2+5x-3x-15}{x^2+4x-3x-12} \div \frac{x^2-5^2}{x^2-5x+4x-20} \times \frac{x-2}{x^2-3x-2x+6}$$
$$= \frac{(x+5)(x-3)}{(x+4)(x-3)} \times \frac{(x-5)(x+4)}{(x-5)(x+5)} \times \frac{(x-2)}{(x-3)(x-2)}$$
$$= \frac{(x+5)(x-3)}{(x+4)(x-3)} \times \frac{(x-5)(x+4)}{(x-5)(x+5)} \times \frac{(x-2)}{(x-3)(x-2)}$$
$$= \frac{1}{(x-3)}$$

নির্ণেয় সরলফল $\frac{1}{(x-3)}$

(খ) $\left(\frac{x}{x-y}-\frac{x}{x+y}\right) \div \left(\frac{y}{x-y}-\frac{y}{x+y}\right) + \left(\frac{x+y}{x-y}+\frac{x-y}{x+y}\right) \div \left(\frac{x+y}{x-y}-\frac{x-y}{x+y}\right)$

সমাধান :

$$\left(\frac{x}{x-y}-\frac{x}{x+y}\right) \div \left(\frac{y}{x-y}-\frac{y}{x+y}\right) + \left(\frac{x+y}{x-y}+\frac{x-y}{x+y}\right) \div \left(\frac{x+y}{x-y}-\frac{x-y}{x+y}\right)$$
$$= \frac{x(x+y)-x(x-y)}{(x-y)(x+y)} \div \frac{y(x+y)-y(x-y)}{(x-y)(x+y)} + \frac{(x+y)(x+y)+(x-y)(x-y)}{(x-y)(x+y)} \div \frac{(x+y)(x+y)+(x-y)(x-y)}{(x-y)(x-y)}$$
$$= \frac{x^2+xy-x^2+xy}{(x-y)(x+y)} \div \frac{xy+y^2-xy+y^2}{(x-y)(x+y)} + \frac{2x^2+2y^2}{(x-y)(x+y)} \div \frac{4xy}{(x-y)(x-y)}$$
$$= \frac{2xy}{(x-y)(x+y)} \times \frac{(x-y)(x+y)}{2y^2} + \frac{2(x^2+y^2)}{(x-y)(x+y)} \times \frac{(x-y)(x-y)}{4xy}$$
$$= \frac{x}{y} + \frac{x^2+y^2}{2xy}$$
$$= \frac{2x^2+x^2+y^2}{2xy}$$
$$= \frac{3x^2+y^2}{2xy}$$

নির্ণেয় সরলফল $\frac{3x^2+y^2}{2xy}$

(গ) $\dfrac{x^2+2x-3}{x^2+x-2} \div \dfrac{x^2+x-6}{x^2-4}$

সমাধান :

$$\frac{x^2+2x-3}{x^2+x-2} \div \frac{x^2+x-6}{x^2-4}$$

$$= \frac{x^2+3x-x-3}{x^2+2x-x-2} \div \frac{x^2+3x-2x-6}{x^2-2^2}$$

$$= \frac{(x+3)(x-1)}{(x+2)(x-1)} \times \frac{(x-2)(x+2)}{(x+3)(x-2)}$$

$$= \frac{(x+3)(x-1)}{(x+2)(x-1)} \times \frac{(x-2)(x+2)}{(x+3)(x-2)}$$

$$= 1$$

নির্ণেয় সরলফল $= 1$

(ঘ) $\dfrac{a^4-b^4}{a^2+b^2-2ab} \times \dfrac{(a+b)^2-4ab}{a^3-b^3} \div \dfrac{a+b}{a^2+ab+b^2}$

সমাধান :

$$\frac{a^4-b^4}{a^2+b^2-2ab} \times \frac{(a+b)^2-4ab}{a^3-b^3} \div \frac{a+b}{a^2+ab+b^2}$$

$$= \frac{(a-b)(a+b)(a^2+b^2)}{(a-b)^2} \times \frac{(a-b)^2}{(a-b)(a^2+ab+b^2)} \times \frac{(a^2+ab+b^2)}{(a+b)}$$

$$= a^2+b^2$$

নির্ণেয় সরলফল a^2+b^2