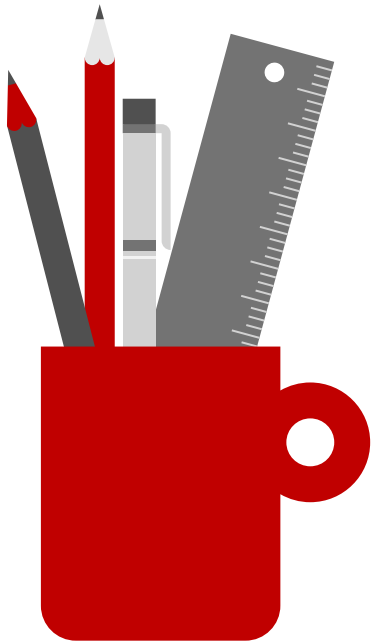

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③ Reduce the following rational expressions to the lowest form.

$$\frac{4\,120\,x^2 y^3 z^5}{36\,x^3 y z^2}$$

$$= \frac{4\,y^{3-1} \cdot z^{5-2}}{x^{3-2}}$$

$$= \frac{4\,y^2 \cdot z^3}{x}$$ Ans.

$$\frac{4 \cancel{8} a(x+1)}{\cancel{2}(x^2-1)}$$

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

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

$$= \frac{4a\cancel{(x+1)}}{\cancel{(x+1)}(x-1)}$$

$$= \frac{4a}{x-1}$$ Ans

iii) $\dfrac{(x+y)^2 - 4xy}{(x-y)^2}$

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

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

$= \dfrac{x^2 + y^2 + 2xy - 4xy}{x^2 + y^2 - 2xy}$

$= \dfrac{x^2 + y^2 - 2xy}{x^2 + y^2 - 2xy}$

$= 1$

$\because\ x^3 - y^3 = (x-y)(x^2+xy+y^2)$

iv) $\dfrac{(x^3-y^3)(x^2-2xy+y^2)}{(x-y)(x^2+xy+y^2)}$

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

$= x^2 - 2xy + y^2$

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

v) $\dfrac{(x+2)(x^2-1)}{(x+1)(x^2-4)}$

$= \dfrac{(x+2)((x)^2-(1)^2)}{(x+1)((x)^2-(2)^2)}$

$= \dfrac{(x+2)(x+1)(x-1)}{(x+1)(x+2)(x-2)}$

$= \dfrac{x-1}{x-2}$

vi) $\dfrac{x^2 - 4x + 4}{2x^2 - 8}$ $\quad \because (a-b)^2 = a^2 + b^2 - 2ab$

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

$= \dfrac{(x)^2 + (2)^2 - 2(x)(2)}{2((x)^2 - (2)^2)}$

$= \dfrac{(x-2)^2}{2(x+2)(x-2)} = \dfrac{x-2}{2(x+2)}$ Ans

vii) $$\frac{64x^5 - 64x}{(8x^2+8)(2x+2)}$$

$$= \frac{64x(x^4-1)}{8(x^2+1)\cdot 2(x+1)}$$

$$= \frac{64x[(x^2)^2 - (1)^2]}{16(x^2+1)(x+1)}$$

$$= \frac{\overset{4}{\cancel{64}}x(x^2+1)(x^2-1)}{\cancel{16}(x^2+1)(x+1)}$$

$$= \frac{4x[(x)^2 - (1)^2]}{x+1}$$

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

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

viii) $\dfrac{9x^2-(x^2-4)^2}{4+3x-x^2}$

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

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

$=x^2+3x-4$

(4) (a) $\frac{x^3y - 2z}{xz}$

(i) $x = 3, y = -1, z = -2$

$$\frac{x^3y - 2z}{xz}$$

$$= \frac{(3)^3.(-1) - 2(-2)}{(3)(-2)}$$

$$= \frac{-27 + 4}{-6}$$

$$= \frac{23}{6}$$

(4) (a) $\dfrac{x^3y - 2z}{xz}$ ii) $x = -1, y = -9, z = 4$

Sol:

$$\frac{x^3y - 2z}{xz}$$

$$= \frac{(-1)^3(-9) - 2(4)}{(-1)(4)}$$

$$= \frac{9 - 8}{-4}$$

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

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

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④ (b) $\dfrac{x^2y^3 - 5z^4}{xyz}$ for $x=4, y=-2, z=-1$

Sol:-

$$\frac{x^2y^3 - 5z^4}{xyz}$$

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

$$= \frac{16 \times -8 - 5}{8}$$

$$= \frac{-128 - 5}{8}$$

$$= \frac{-133}{8}$$

(5) (i) $\frac{15}{2x-3y} - \frac{4}{3y-2x}$

$= \frac{15}{2x-3y} - \frac{4}{-(2x-3y)}$

$= \frac{15}{2x-3y} + \frac{4}{2x-3y} = \frac{19}{2x-3y}$

$= \frac{15+4}{2x-3y}$

(5) ii) $\dfrac{1+2x}{1-2x} - \dfrac{1-2x}{1+2x}$

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

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

$= \dfrac{(1+2x)^2 - (1-2x)^2}{(1-2x)(1+2x)}$

$= \dfrac{(1+4x^2+4x) - (1+4x^2-4x)}{(1)^2 - (2x)^2}$

$= \dfrac{1+4x^2+4x-1-4x^2+4x}{1-4x^2}$

$= \dfrac{8x}{1-4x^2}$ Ans

(5) iii) $\dfrac{x^2-25}{x^2-36} - \dfrac{x+5}{x+6}$

$= \dfrac{x^2-25}{(x)^2-(6)^2} - \dfrac{x+5}{x+6}$

$= \dfrac{x^2-25}{(x+6)(x-6)} - \dfrac{x+5}{x+6}$

$= \dfrac{1}{x+6}\left[\dfrac{x^2-25}{x-6} - \dfrac{x+5}{1}\right]$

$= \dfrac{1}{x+6}\left[\dfrac{x^2-25-(x+5)(x-6)}{x-6}\right]$

$= \dfrac{1}{x+6}\left[\dfrac{x^2-25-(x^2-6x+5x-30)}{x-6}\right]$

$= \dfrac{1}{x+6}\left[\dfrac{x^2-25-(x^2-x-30)}{x-6}\right]$

$= \dfrac{1}{x+6}\left[\dfrac{x^2-25-x^2+x+30}{x-6}\right]$

$= \dfrac{1}{x+6}\left[\dfrac{x+5}{x-6}\right]$

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

5)iv) $\frac{x}{x-y} - \frac{y}{x+y} - \frac{2xy}{x^2-y^2}$

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

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

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

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

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

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

5) v) $\dfrac{x-2}{x^2+6x+9} - \dfrac{x+2}{2x^2-18}$

$= \dfrac{x-2}{(x)^2+(3)^2+2(x)(3)} - \dfrac{x+2}{2(x^2-9)}$

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

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

$= \dfrac{1}{x+3}\left[\dfrac{x-2}{x+3} - \dfrac{x+2}{2(x-3)}\right]$

$= \dfrac{1}{x+3}\left[\dfrac{2(x-3)(x-2) - (x+3)(x+2)}{2(x+3)(x-3)}\right]$

$= \dfrac{1}{x+3}\left[\dfrac{2(x^2-2x-3x+6) - (x^2+2x+3x+6)}{2(x+3)(x-3)}\right]$

$= \dfrac{1}{x+3}\left[\dfrac{2(x^2-5x+6) - (x^2+5x+6)}{2(x+3)(x-3)}\right]$

$= \dfrac{1}{x+3}\left[\dfrac{2x^2-10x+12-x^2-5x-6}{2(x+3)(x-3)}\right]$

$= \dfrac{1}{x+3}\left[\dfrac{x^2-15x+6}{2(x+3)(x-3)}\right]$

$= \dfrac{x^2-15x+6}{2(x+3)^2(x-3)}$ Ans.

v) vi) $\frac{1}{x-1} - \frac{1}{x+1} - \frac{2}{x^2+1} - \frac{4}{x^4-1}$

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

$= \frac{x+1-x+1}{x^2-1} - \frac{2}{x^2+1} - \frac{4}{x^4-1}$

$= \frac{2}{x^2-1} - \frac{2}{x^2+1} - \frac{4}{x^4-1}$

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

$= \frac{2x^2+2-2x^2+2}{x^4-1} - \frac{4}{x^4-1}$

$= \frac{4}{x^4-1} - \frac{4}{x^4-1}$

$= 0$ Ans

6)

(i) $x^2 - 49 \cdot \dfrac{5x+2}{x+7}$

$= (x)^2 - (7)^2 \times \dfrac{5x+2}{x+7}$

$= (x+7)(x-7) \times \dfrac{5x+2}{x+7}$

$= (x-7)(5x+2)$

6) ii) $\dfrac{4x-12}{x^2-9} \div \dfrac{18-2x^2}{x^2+6x+9}$

$= \dfrac{4(x-3)}{(x)^2-(3)^2} \div \dfrac{2(9-x^2)}{(x)^2+2(x)(3)+(3)^2}$

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

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

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

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

$= \dfrac{2}{3-x}$

$= \dfrac{-2}{x-3}$

6) iii) $\dfrac{x^6 - y^6}{x^2 - y^2} \div (x^4 + x^2y^2 + y^4)$

$= \dfrac{(x^2)^3 - (y^2)^3}{x^2 - y^2} \times \dfrac{1}{x^4 + x^2y^2 + y^4}$

$= \dfrac{(x^2 - y^2)(x^4 + x^2y^2 + y^4)}{x^2 - y^2} \times \dfrac{1}{x^4 + x^2y^2 + y^4}$

$= 1$ Ans.

6) iv) $\dfrac{x^2-1}{x^2+2x+1} \cdot \dfrac{x+5}{1-x}$

$= \dfrac{(x)^2-(1)^2}{(x)^2+2(x)(1)+(1)^2} \cdot \dfrac{x+5}{-(x-1)}$

$= \dfrac{(x+1)(x-1)}{(x+1)^2} \cdot \dfrac{x+5}{-(x+1)}$

$= \dfrac{x+5}{-(x+1)}$

$= -\dfrac{x+5}{x+1}$ Ans.

6) (v) $\dfrac{x^2+xy}{y(x+y)} \cdot \dfrac{x^2+xy}{y(x+y)} \div \dfrac{x^2-x}{xy-2y}$

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

$= \dfrac{x}{y} \cdot \dfrac{x}{y} \times \dfrac{y(x-2)}{x(x-1)}$

$= \dfrac{x(x-2)}{y(x-1)}$ Ans.