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

$= \frac{x^3+2}{x^2}$, $Dom_{min} = \{x \in \mathbb{R} : x \neq 0 \wedge x \neq -2\}$

(b) $\frac{w^3-7w^2}{w^2-14w+49} = \frac{w^2(w-7)}{(w-7)^2} = \frac{w^2}{w-7}$, $DOM = \mathbb{R} - \{7\}$

(c) $\frac{x+1}{x^4-x^2} = \frac{x+1}{x^2(x^2-1)} = \frac{x+1}{x^2(x+1)(x-1)} = \frac{1}{x^2(x-1)}$, $= \mathbb{R} - \{0, 1, -1\}$

(d) $\frac{27w^3-8}{6w-4} = \frac{(3w)^3-2^3}{2(3w-2)} = \frac{(3w-2)(9w^2+6w+4)}{2(3w-2)} =$

$\frac{9w^2+6w+4}{2}$ $Dom = \mathbb{R} - \{\frac{2}{3}\}$.

---

② (a) $\frac{z^3-125}{z^2} \times \frac{z^2+5z}{z^2-25} = \frac{z^3-5^3}{z^2} \times \frac{z(z+5)}{z^2-5^2} =$

$= \frac{(z-5)(z^2+5z+25)}{z^2} \times \frac{z(z+5)}{(z+5)(z-5)} = \frac{z^2+5z+25}{z}$

(b) $\frac{\frac{xy}{2y-2}}{\frac{xyz+xz}{y^2-1}} = \frac{xy}{2(y-1)} \cdot \frac{(y+1)(y-1)}{xz(y+1)} = \frac{y}{2z}$

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

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

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

(e) $\frac{u^3-v^3}{u^2-v^2} = \frac{(u-v)(u^2+uv+v^2)}{(u-v)(u+v)} = \frac{u^2+uv+v^2}{u+v}$

(f) $\frac{x^3-8y^3}{x^2-4xy+4y^2} = \frac{x^3-(2y)^3}{(x-2y)^2} = \frac{(x-2y)(x^2+2xy+4y^2)}{(x-2y)^{\neq 1}} =$

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

(g) $\frac{(x^2+14x+49)(x^2-49)}{x^2-14x+49} = \frac{(x+7)^2(x+7)(x-7)}{(x-7)^{\neq 1}} = \frac{(x+7)^3}{x-7}$

(h) $\frac{ax+2a+5x+10}{a^2+10a+25} = \frac{a(x+2)+5(x+2)}{(a+5)^2} = \frac{(x+2)(a+5)}{(a+5)^{\neq 1}} =$

$= \frac{x+2}{a+5}$

(i) $\frac{1}{a^2-ab} - \frac{1}{ab-b^2} = \frac{1}{a(a-b)} - \frac{1}{b(a-b)} =$

$= \frac{b}{ab(a-b)} - \frac{a}{ab(a-b)} = \frac{b-a}{ab(a-b)} = \frac{-(a-b)}{ab(a-b)} = \frac{-1}{ab}$

(j) $\frac{2a-2b}{10} \div \frac{a^2-b^2}{5a+5b} = \frac{2(a-b)}{10} \times \frac{5(a+b)}{(a-b)(a+b)} =$

$= 1$

(k) $\frac{3}{1+y} - \frac{4}{1-y} - \frac{8}{1-y^2} = \frac{3(1-y) - 4(1+y) - 8}{(1+y)(1-y)} =$

$\frac{3-3y-4-4y-8}{(1+y)(1-y)} = \frac{-5-4-7y}{(1+y)(1-y)} = \frac{-9-7y}{(1+y)(1-y)}$

ERA PISAL +

(k) $\frac{3}{1+y} - \frac{4}{1-y} - \frac{8}{1-y^2} =$

(l) $\dfrac{(a^2b^2)^4(a^3b^2)^3}{(a^4b^2)^2} = \dfrac{a^8 b^8 a^9 b^6}{a^8 b^4} = a^9 b^{10}$

(3) (a) $5(2x-3)^2 - 20 = 5(2x-3)^2 - 5\cdot 4 =$

$= 5\left((2x-3)^2 - 4\right) = 5\left((2x-3)^2 - 2^2\right) = 5\left(((2x-3)+2)((2x-3)-2)\right) =$

$= 5\left((2x-1)(2x-5)\right) = 5(2x-1)(2x-5)$

(b) $3x^4 + 24x = x(3x^3 + 24) = 3x(x^3 + 8) = 3x(x^3 + 2^3) =$

$= 3x(x+2)(x^2 - 2x + 4) =$ [illegible]

(c) $18y^3 + 48y^2 + 32y =$ [illegible] $2y(9y^2 + 24y + 16) =$

[illegible] $= 2y\left((3y)^2 + 2\cdot(3y)\cdot 4 + (4)^2\right) =$

$= 2y(3y+4)^2$