Alg 2: Homework 22

① $\dfrac{7}{y^2-49} - \dfrac{6}{y^2-2y-35}$

$= \dfrac{7}{(y+7)(y-7)} - \dfrac{6}{(y-7)(y+5)}$ [LCD = $(y+7)(y-7)(y+5)$]

$= \dfrac{7}{(y+7)(y-7)}\left(\dfrac{y+5}{y+5}\right) - \dfrac{6}{(y-7)(y+5)}\left(\dfrac{y+7}{y+7}\right)$

$= \dfrac{7y+35-6y-42}{(y+7)(y-7)(y+5)}$

$= \dfrac{(y-7)^{1}}{(y+7)(y-7)_{1}(y+5)} = \boxed{\dfrac{1}{(y+7)(y+5)}}$

② $\dfrac{2y^2-6y}{y-7} \div \dfrac{3-y}{2y-14}$

$= \dfrac{2y(y-3)^{(-1)}}{(y-7)} \cdot \dfrac{2(y-7)}{(3-y)} = \boxed{-4y}$

③ $\dfrac{\left(x-\frac{1}{x}\right)x}{\left(\frac{1-x^2}{x}\right)x} = \dfrac{x^2-1}{1-x^2} = \boxed{-1}$

④ $\dfrac{\left(\frac{a}{b}-\frac{b}{a}\right)ab}{\left(1-\frac{b}{a}\right)ab} = \dfrac{a^2-b^2}{ab-b^2}$

$= \dfrac{(a+b)(a-b)}{b(a-b)} = \boxed{\dfrac{a+b}{b}}$

(5) $\dfrac{\left(1 + \frac{7}{y+2}\right)}{\left(1 + \frac{3}{y+2}\right)} \dfrac{(y-2)(y+2)}{(y-2)(y+2)}$

$= \dfrac{(y-2)(y+2) + 7(y+2)}{(y-2)(y+2) + 3(y-2)}$

$= \dfrac{y^2 - 4 + 7y + 14}{y^2 - 4 + 3y - 6}$

$= \dfrac{y^2 + 7y + 10}{y^2 + 3y - 10}$

$= \dfrac{(y+5)(y+2)}{(y+5)(y-2)} = \boxed{\dfrac{y+2}{y-2}}$

(6) $\dfrac{\left(\frac{3}{b} - 1\right) b^2}{\left(1 - \frac{6}{b} + \frac{9}{b^2}\right) b^2}$

$= \dfrac{3b - b^2}{b^2 - 6b + 9}$

$= \dfrac{b(3-b)^{(-1)}}{(b-3)(b-3)}$

$= \boxed{\dfrac{-b}{b-3}}$ or $\dfrac{b}{3-b}$