12/18/12 Final Review 2

① Simplify $\frac{x^2-x-6}{x^2+6x+5} \cdot \frac{x+5}{x-3}$

$\frac{(x+2)(x-3)}{(x+5)(x+1)} \cdot \frac{x+5}{x-3}$

$\boxed{\frac{x+2}{x+1}}$

② $\frac{x^2-x-12}{x^2+9x+14} \div \frac{x-4}{x^2+14x+49}$

$\frac{(x+3)(x-4)}{(x+7)(x+2)} \cdot \frac{x^2+14x+49}{x-4}$

$\frac{(x+3)(x-4)}{(x+7)(x+2)} \cdot \frac{(x+7)(x+7)}{x-4} = \frac{(x+3)(x+7)}{x+2}$

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

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

$\boxed{\frac{x^2+4x-6}{x(x-2)}}$

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

$\frac{x^2-7x+12-(x^2+7x+10)}{(x-4)(x+2)}$

$\frac{x^2-7x+12-x^2-7x-10}{(x-4)(x+2)}$

$\frac{-14x+2}{(x-4)(x+2)} = \boxed{\frac{2(-7x+1)}{(x-4)(x+2)}}$

⑤ find $g^{-1}(x)$ when $g(x) = \frac{4}{3}x - 8$

$y = \frac{4}{3}x - 8$

$x = \frac{4}{3}y - 8$

$+8 \quad +8$

$\frac{3}{4}(x+8) = \frac{4}{3}y\left(\frac{3}{4}\right)$

$\frac{3}{4}x + \frac{3}{4}(8)2 = y$

$y = \frac{3}{4}x + 6$

$\boxed{g^{-1}(x) = \frac{3}{4}x + 6}$

⑥ find $(f \circ g)(x)$ if

$f(x) = 2x^2 + 4x - 2$ and

$g(x) = x+1$

$(f \circ g)(x) \rightarrow f(g(x))$.

$f(g(x)) = 2(\quad)^2 + 4(\quad) - 2$

$= 2(x+1)^2 + 4(x+1) - 2$

$= 2(x^2+2x+1) + 4x + 4 - 2$

$= 2x^2 + 4x + 2 + 4x + 4 - 2$

$\boxed{f(g(x)) = 2x^2 + 8x}$