

(5 pts) 3. Simplify $\frac{\frac{x+2}{x^2-1} + (x+1)^{-1}}{\frac{x}{2x^2-x-1} + \frac{1}{x-1}}$

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

$$= \frac{x+2+x-1}{(x-1)(x+1)} \cdot \frac{x+2x+1}{(2x+1)(x-1)} \quad (2+2) \text{ pts}$$

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

$$= \frac{(2x+1)^2}{(x+1)(3x+1)} \quad (1 \text{ pt})$$

(4 pts) 4. $\frac{r^{-1}+q^{-1}}{r^{-1}-q^{-1}} \cdot \frac{r-q}{r+q}$

$$= \frac{\frac{1}{r} + \frac{1}{q}}{\frac{1}{r} - \frac{1}{q}} \cdot \frac{r-q}{r+q}$$

$$= \frac{q+r}{r \cdot q} \cdot \frac{r \cdot q}{q-r} \cdot \frac{r-q}{r+q}, \text{ Notice that } r-q = -(r-q) \quad (2 \text{ pts})$$

$$= -1$$

(1 pt)