Name: _____

Complex Rational Functions

1) Perform the indicated operations:

1) $\dfrac{\frac{1}{x}-\frac{1}{y}}{\frac{1}{x^2}-\frac{1}{y^2}}$

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

3) $4+\dfrac{3}{2+\frac{1}{x+3}}$

4) $\dfrac{a^{-1}+b^{-1}}{a^{-2}-b^{-2}}$

5) $\dfrac{x^2-\frac{1}{x}}{x+\frac{1}{x}+1}$

6) $\dfrac{\frac{1}{x+1}+\frac{1}{1-x}}{\frac{1}{-x+1}-\frac{1}{1+x}}$

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

8) $\dfrac{\frac{a+b}{a-b}+\frac{a-b}{a+b}}{\frac{a+b}{a-b}-\frac{a-b}{a+b}}$

2) Perform the indicated operation and then simplify your answer

1) $\dfrac{3xyz}{yz+xz+xy}-\dfrac{\frac{x-1}{x}+\frac{y-1}{y}+\frac{z-1}{z}}{\frac{1}{x}+\frac{1}{y}+\frac{1}{z}}$

2) $\left(\dfrac{a^2+c^2}{a^2-c^2}-\dfrac{a^2-c^2}{a^2+c^2}\right)\div\left(\dfrac{a+c}{a-c}-\dfrac{a-c}{a+c}\right)$

3) Simplify the expression:

$$E = 1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{1 + \cfrac{1}{x}}}}}$$

4) Rewrite each fraction as a single rational expression

1) $\dfrac{\dfrac{2x-1}{x^2}}{\dfrac{2x^2+3x-2}{x}}$

2) $\dfrac{\dfrac{x^2-9}{x^2-2x-3}}{\dfrac{x^2+6x+9}{x+1}}$

3) $\dfrac{\dfrac{1}{x-2}+\dfrac{1}{x+2}}{\dfrac{x}{x+2}-\dfrac{x}{x-2}}$