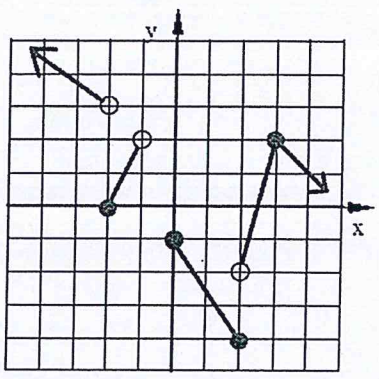
Bellwork Alg 2 Thursday, September 13, 2018

Use these functions. Simplify your answers. $f(x) = \frac{x}{x-1}$ $g(x) = \frac{x}{x+3}$

1. Find $f(g(3))$

2. Find $f(g(x))$.

3. State the Domain and Range of this graph in Interval Notation.



Domain:

Range:

Bellwork Alg 2 Thursday, September 13, 2018 ANSWERS

Use these functions. Simplify your answers. $f(x) = \frac{x}{x-1}$ $g(x) = \frac{x}{x+3}$

1. Find $f(g(3))$

1st find $g(3)$: $g(3) = \frac{3}{3+3} = \frac{3}{6} = \frac{1}{2}$

2nd $f(g(3))$ is now $f(1/2)$: $f(1/2) = \frac{\frac{1}{2}}{\frac{1}{2}-1} = \frac{\frac{1}{2}}{-1/2} = -1$

$f(g(3)) = -1$

2. Find $f(g(x))$. substitute $g(x)$ into $f(x)$

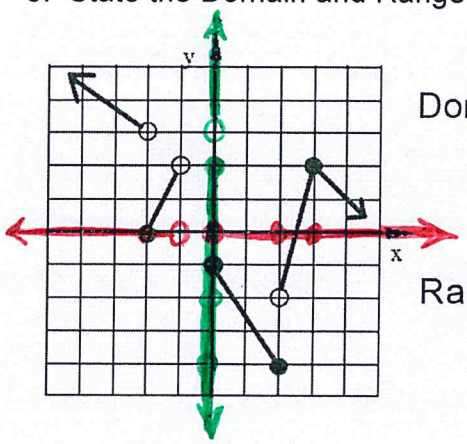
$$f(g(x)) = \frac{\left(\frac{x}{x+3}\right)}{\left(\frac{x}{x+3}\right)-1} = \frac{\frac{x}{x+3}}{\frac{x}{x+3}-\frac{x+3}{x+3}} = \frac{\frac{x}{x+3}}{\frac{-3}{x+3}}$$

$$= \frac{x}{x+3} \cdot \frac{x+3}{-3}$$

$$= \frac{x}{-3}$$

$f(g(x)) = -\frac{x}{3}$ or $-1/3\,x$

3. State the Domain and Range of this graph in Interval Notation.



Domain: $(-\infty, -1) \cup [0, \infty)$

Range: $(-\infty, 2] \cup (3, \infty)$