Math 418 Worksheet 6

October 12, 2020

Directions: Justify ALL your answers. Note some answers can be justified simply by showing your work.

1 The sum of a number a and its reciprocal is $\frac{17}{5}$. Find all possible values for a.

2 Given that the domain and range of $f(x) = \frac{1}{x}$ is $\{x|x \neq 0\}$, find the domain and range of $g(x) = \frac{3}{x+10} + 5$ Hint: Think transformations!

3 Find the horizontal asymptotes for the following functions. If no horizontal asymptote exists write "No H.A."

a) $r(x) = \frac{4x^2 - x^3 + x + 2}{\pi x^3 + 4x}$

b) $g(x) = \frac{3x^2 - 4}{8x + 9}$

c) $w(x) = \frac{12x^4 - 9x + 4}{3x^2 - 19}$

4 Suppose f and g are defined by the following tables.

x	$f(x)$
2	8
3	11
4	13
5	1

x	$g(x)$
1	2
2	4
3	4
4	5

a) Suppose $p(x) = 3x + 2$. Give a table for $(f \circ g)(x)$.

b) Give a table for $(f \circ g)(x)$ What is the domain of $f \circ g$?

c) Give a table for $(g \circ g)(x)$. What is the domain of $g \circ g$?

5 Suppose $f(x) = \frac{3x-1}{x+2}$ and $g(x) = \sqrt{x}$ Evaluate both $(f \circ g)(x)$ and $(g \circ f)(x)$.

6 Find a function $h(x)$ so that $(f \circ h)(x) = \frac{x^2}{x^6 - 1}$ with $f(x) = \frac{x}{x^3 - 1}$.

7 Find a function $h(x)$ so that $(h \circ f)(x) = 0$ with $f(x) = x^3$.

8 Given $f(x) = x^2 + 1, g(x) = \frac{2}{x}$ and $h(x) = 12x$ evaluate $(f \circ g \circ h)(x)$.

9 Find a function $h(x)$ so that $(f \circ h)(x) = x$ for $f(x) = x + 2$.

10 Find a function $h(x)$ so that $(f \circ h)(x) = x$ for $f(x) = 3x$.

11 Find a function $h(x)$ so that $(f \circ h)(x) = x$ for $f(x) = x^3 + 4$.

12 Find $f^{-1}(x)$ for $f(x) = 7x^5 - 12$

13 Find $f^{-1}(x)$ for $f(x) = \frac{2}{x+3}$

14 Find the domain, range and inverse for $f(x) = \frac{2x+1}{4x-5}$

15 Suppose $f^{-1}(x) = 3x - 4$. Find $f(x)$.

16 Find the domain, range and inverse for $f(x) = \frac{8x-10}{2x-3}$

17 Suppose $f(x)$ has domain $(-1, 12)$ and range $[3, 4]$. What are the domain and range of $f^{-1}(x)$?

18 Give an example of a function that is it's own inverse.