Senior Analysis Name _____
Review Lectures 22-24

1. Find $f(g(x))$ and $g(f(x))$ for each of the following.

a) $f(x) = 5x - 2$, $g(x) = 3x + 1$

b) $f(x) = \dfrac{2x-1}{x+2}$, $g(x) = \dfrac{x-3}{x+1}$

2. Find $f^{-1}(x)$ for each of the following functions.

a) $f(x) = 5x - 2$ b) $f(x) = \sqrt{1-3x}$ c) $f(x) = \dfrac{2x+3}{5x-1}$

3. Evaluate each of the following limits.

a) $\lim\limits_{x\to\infty}\left(\dfrac{5x-3}{3x+1}\right)$

b) $\lim\limits_{x\to 1}\left(\dfrac{5x-3}{3x+1}\right)$

c) $\lim\limits_{x\to 6}\left(\dfrac{x-6}{x^2-36}\right)$

d) $\lim\limits_{x\to -2}\left(\dfrac{2x^2+5x+2}{x^3+8}\right)$

e) $\lim\limits_{x\to\infty}\left(\dfrac{2x^2+5x+2}{x^3+8}\right)$

f) $\lim\limits_{x\to -\frac{2}{3}}\left(\dfrac{9x^2-4}{6x^2+x-2}\right)$

g) $\lim\limits_{x\to 1}\left(\dfrac{x^4-1}{x^3-1}\right)$

(h) $\lim\limits_{x\to 2}\left(\dfrac{x^3-2x^2-4x+8}{x^3-8}\right)$

i) $\lim\limits_{x\to 4}\left(\dfrac{\sqrt{6x+1}-5}{x^2-16}\right)$

(j) $\lim\limits_{x\to 2}\left(\dfrac{3x^2-5x-2}{\sqrt{5x^2-4}-4}\right)$

4. Find all x such that $f(g(x)) = g(f(x))$ if $f(x) = x - 6$ and $g(x) = x^2 - x + 2$.

5. Given $f(x) = \sqrt{2x-4}$, make a table of values for f(x) and $f^{-1}(x)$. Plot both on the same axes.

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Answers

1. a) $f(g(x)) = 18x^2 + 12x - 1$, $g(f(x)) = 6x^2 - 8$

b) $f(g(x)) = \frac{x - 7}{3x - 1}$, $g(f(x)) = \frac{-x - 7}{3x + 1}$

2. a) $f^{-1}(x) = \frac{x + 2}{5}$ b) $f^{-1}(x) = \frac{1 - x^2}{3}$ c) $f^{-1}(x) = \frac{x + 3}{5x - 2}$

3. a) $\frac{5}{3}$

b) $\frac{1}{2}$

c) $\frac{1}{12}$

d) $-\frac{1}{4}$

e) 0

f) $\frac{12}{7}$

g) $\frac{4}{3}$

h) 0

i) $\frac{3}{40}$

j) $\frac{14}{5}$

4. $x = 4$