

Second midterm test, 22nd November 2023

Name: _____

Points: /25

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1. Let $f : \{1, 2, 3\} \rightarrow \{3, 5, 6\}$ and $g : \{3, 5, 6\} \rightarrow \{1, 2, 3\}$ be given as

$$f(1) = 5, f(2) = 5, f(3) = 3, g(3) = 2, g(5) = 1, g(6) = 3.$$

Write $g \circ f$ and $f \circ g$, decide, whether f , g , $g \circ f$ and $f \circ g$ are one-to-one or onto.

Points: /3

2. Determine the domain of

$$f(x) = \sqrt{\frac{x+1}{2x-5}}$$

Points: /3

3. Compute (without the l'Hospital rule):

$$\lim_{x \rightarrow 4} \frac{\sqrt{x} - 2}{\sqrt{x+5} - 3}$$

Points: /4

4. Compute

$$\left(\frac{\sqrt{2x+6}}{x+2} \right)''$$

Points: /5

5. Examine the course of

$$f(x) = \frac{8(x-2)}{x^2}$$

Points: /10