Fall 2026, Math 296: Week 9 Preliminary Problems
Due: Thursday, October 22nd, 2026
Functions

Preliminary problems. These problems should be completed before discussion on Thursday.

(P1) Let $A = \{1, 2, 3, 4\}$ and $B = \{5, 6, 7, 8, 9\}$, and consider the functions $f : A \to B$ and $g : B \to A$ given by $f(a) = a + 4$ and

$$g(b) = \begin{cases} b - 5 & \text{if } b \text{ is even;} \\ 1 & \text{if } b \text{ is odd.} \end{cases}$$

(a) Write $\mathrm{Im}(f)$ and $\mathrm{Im}(g)$ in list notation.

(b) Find the domain and codomain of $f \circ g$, and write its image in list notation. Then do the same for $g \circ f$.

(c) Determine the injectivity and surjectivity of f and g.