

Let  $X = \{x_1, x_2, x_3, x_4\}$ ,  $Y = \{y_1, y_2, y_3, y_4\}$ ,  $Z = \{z_1, z_2, z_3\}$ , and define  $f : X \rightarrow Y$ ,  $g : Y \rightarrow Z$ ,  $h : Z \rightarrow X$  by  $f(x_1) = y_1$ ,  $f(x_2) = y_3$ ,  $f(x_3) = y_4$ ,  $f(x_4) = y_2$ ,  $g(y_1) = z_1$ ,  $g(y_2) = z_1$ ,  $g(y_3) = z_3$ ,  $g(y_4) = z_2$ ,  $h(z_1) = x_1$ ,  $h(z_2) = x_2$ , and  $h(z_3) = x_4$ . Find  $h \circ g$  and  $g \circ f$ . Is  $f$  one-to-one, onto, or invertible? How about  $g$  and  $h$ ? Find the inverse functions of whatever functions are invertible.