Mock Quiz 5

Problem 1. Let the function f be defined by

$$f(x) = 5 + x^2 \ , \qquad x \in [2, 7] \ .$$

(a) What are the domain D_f and the range R_f of f?

(b) Find $f'(x)$ and $f'(6)$.

(c) Is the function f one-to-one on $[2, 7]$? Why?

(d) What are the domain $D_{f^{-1}}$ and the range $R_{f^{-1}}$ of the inverse function f^{-1} of f?

(e) Find an explicit expression for f^{-1}, namely, a formula $f^{-1}(y) = \cdots$.

(f) Find $f^{-1}(41)$.

(g) Use the expression for $f^{-1}(y)$ from part (e) to find $(f^{-1})'(y)$ and $(f^{-1})'(41)$.

(h) Use the formula derived in the last lecture,

$$(f^{-1})'(y) = \frac{1}{f'(f^{-1}(y))}$$

to find $(f^{-1})'(y)$ and $(f^{-1})'(41)$.