

(6 pts.)

①.  $f(x) = 4(x-2)^2 + 6$ ;  $x \leq 2$ .

a)  $f^{-1}(x) = ?$

$y = 4(x-2)^2 + 6$  } getting to here: (2.5 pts.)

$y - 6 = 4(x-2)^2$

$\frac{1}{4}(y-6) = (x-2)^2$

$\pm \sqrt{\frac{1}{4}(y-6)} = x-2$

correct choice of sign: (1 pt.)

$x-2 \leq 0 \Rightarrow$  choose  $\ominus$  sign:  $x-2 = -\frac{1}{2}\sqrt{y-6}$ ;  $x = 2 - \frac{1}{2}\sqrt{y-6}$  (1 pt.)

$f^{-1}(x) = 2 - \frac{1}{2}\sqrt{x-6}$  (0.5 pts.)

b) Domain of  $f^{-1}$ ?

$[6, \infty)$

(1 pt.)

②.  $f$ : continuous, one-to-one function;

(4 pts.)

$f(0) = 1$ ;  $f'(0) = 0$

$f(1) = 2$ ;  $f'(1) = 2$

$f(2) = 5$ ;  $f'(2) = 4$ .

$(f^{-1})'(5) = ?$

$(f^{-1})'(5) = \frac{1}{f'(f^{-1}(5))}$

(1.5 pts. for formula)

$= \frac{1}{f'(2)}$

(1.5 pts. for  $f^{-1}(5) = 2$ )

$= \left(\frac{1}{4}\right)$

(1 pt.)