

$$\sqrt{5) \quad c^*(y) = \max_x \{xy - c(x)\}$$

show this is convex w.r.t. y

convex func. : $f(x)$ is convex if & only if
 $f(\lambda x_1 + (1-\lambda)x_2) \leq \lambda f(x_1) + (1-\lambda)f(x_2)$
 $\forall x_1, x_2 \in X, \forall \lambda \in [0, 1]$

$$\frac{dc^*(y)}{dy} = x$$

$$\frac{d^2c^*(y)}{dy^2} = 0$$

$c^*(y)$ is linear w.r.t. y
 $\therefore \max\{c^*(y)\}$ is convex w.r.t. y