Economics 511 Problem Set 14-3 Short Answers

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1.

$$\begin{aligned}\frac{\partial \pi(p,\mathbf{w})}{\partial p} &= y^* = y(p,\mathbf{w}) \\ \frac{\partial \pi(p,\mathbf{w})}{\partial w_i} &= -x_i^* = x_i\left(p,\mathbf{w}\right), i = 1,...,n.\end{aligned}$$

2.

$$\begin{aligned}L &= \mathbf{w}\cdot\mathbf{x} + \boldsymbol{\lambda}\left(y - f(\mathbf{x})\right) \\ \frac{\partial c(\mathbf{w},y)}{\partial y} &= \lambda^* = \lambda(\mathbf{w},y).\end{aligned}$$

3.

$$\begin{aligned}\frac{\partial v(w,p,V,T)}{\partial w} &= \lambda^*\left(T - \ell^*\right) \\ \frac{\partial v(w,p,V,T)}{\partial V} &= \lambda^* \\ T - \ell^* &= h^* = \frac{\dfrac{\partial v(w,p,V,T)}{\partial w}}{\dfrac{\partial v(w,p,V,T)}{\partial V}}\end{aligned}$$