HW7 - Additional Problems

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AP(xvi) For $i = 1, 2$ let X_i, $Y_i \subseteq \mathbb{R}^n$ and let $R_i : X_i \to Y_i$ be two correspondences. Define

$$\begin{aligned} R_1 \times R_2 \ : \ X_1 \times X_2 &\rightrightarrows Y_1 \times Y_2 \\ (x_1, x_2) &\mapsto (R_1(x_1), R_2(x_2)) \end{aligned}$$

(a) If both R_i, $i = 1, 2$ are convex correspondences, show that $R_1 \times R_2$ is convex correspondence.

(b) If both R_i, $i = 1, 2$ are continuous correspondences, show that $R_1 \times R_2$ is continuous correspondence.

AP(xvii) (a) Prove (ii) implies (i) of theorem 12 of the notes:
Theorem 12 Let Ω be a set and $\preceq$ a preference relation on $\Omega \times \Omega$. Let u, $u' : \Omega \to \mathbb{R}$ be two utility functions, both consistent with $\preceq$. Then the following two statements are equivalent.

(i) $E[u(\cdot)]$ and $E[u'(\cdot)]$ induce the same preference relation on $\text{lott}(\Omega)$.

(ii) There exist A, $B \in \mathbb{R}$, with $A > 0$ such that $u'(x) = Au(x) + B$ for all $x \in \Omega$.

(b) How does $u' = Au + B$ relate to u if $A < 0$?

(c) How does $u' = Au + B$ relate to u if $A = 0$?