[12] **2.** Consider the following problem.

$$\begin{array}{lrcl} \text{maximize} & c_1x_1 + c_2x_2 + c_3x_3 & & \\ \text{subject to} & 3x_1 + x_2 - x_3 & \leq & -2 \\ & x_1 - x_2 - 2x_3 & \leq & -3 \\ & x_1 & \leq & 2 \\ & x_1, x_2, x_3 \geq 0 & & \end{array} \qquad (*)$$

(a) Solve problem $(*)$ when $(c_1, c_2, c_3) = (-3, -4, -2)$.

(b) Solve problem $(*)$ when $(c_1, c_2, c_3) = (7, 0, -2)$.

(c) Suppose $(c_1, c_2, c_3) = (7, k, -2)$ in problem $(*)$. Find a value of k for which problem $(*)$ has more than one maximizing point. For this k, display two different maximizers.

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