[12] **1.** Consider the following problem:

$$\begin{aligned} \text{maximize } & \zeta = -5x_1 + 6x_2 - 4x_3 \\ \text{subject to } & 2x_1 + 3x_2 - x_3 \leq -2 \\ & -x_1 + 2x_2 + 2x_3 \leq 3 \\ & x_1, x_2, x_3 \geq 0 \end{aligned}$$

(a) Write the dual problem.

(b) Show that the dual problem is unbounded, by presenting a sequence of feasible inputs for the dual problem whose objective values diverge to $-\infty$.
(*One reasonable approach starts with a sketch.*)

(c) What does the result in part (b) tell us about the problem stated above?

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