

4. Write the dual for each of the following primal problems:

(a) Maximize $z = -5x_1 + 2x_2$
subject to

$$-x_1 + x_2 \leq -2$$

$$2x_1 + 3x_2 \leq 5$$

$$x_1, x_2 \geq 0$$

(b) Minimize $z = 6x_1 + 3x_2$
subject to

$$6x_1 - 3x_2 + x_3 \geq 2$$

$$3x_1 + 4x_2 + x_3 \geq 5$$

$$x_1, x_2, x_3 \geq 0$$

(c) Maximize $z = x_1 + x_2$
subject to

$$2x_1 + x_2 = 5$$

$$3x_1 - x_2 = 6$$

x_1, x_2 unrestricted