5. Graph the feasible region for the following LPP. You will be graded on three aspects: correctly drawn edges, correctly shaded region, and correctly labelled corners. (The numbers in this problem are not related to either word problem, but you may find the picture on #6 to be a good model of clear edges, corners, and labels).

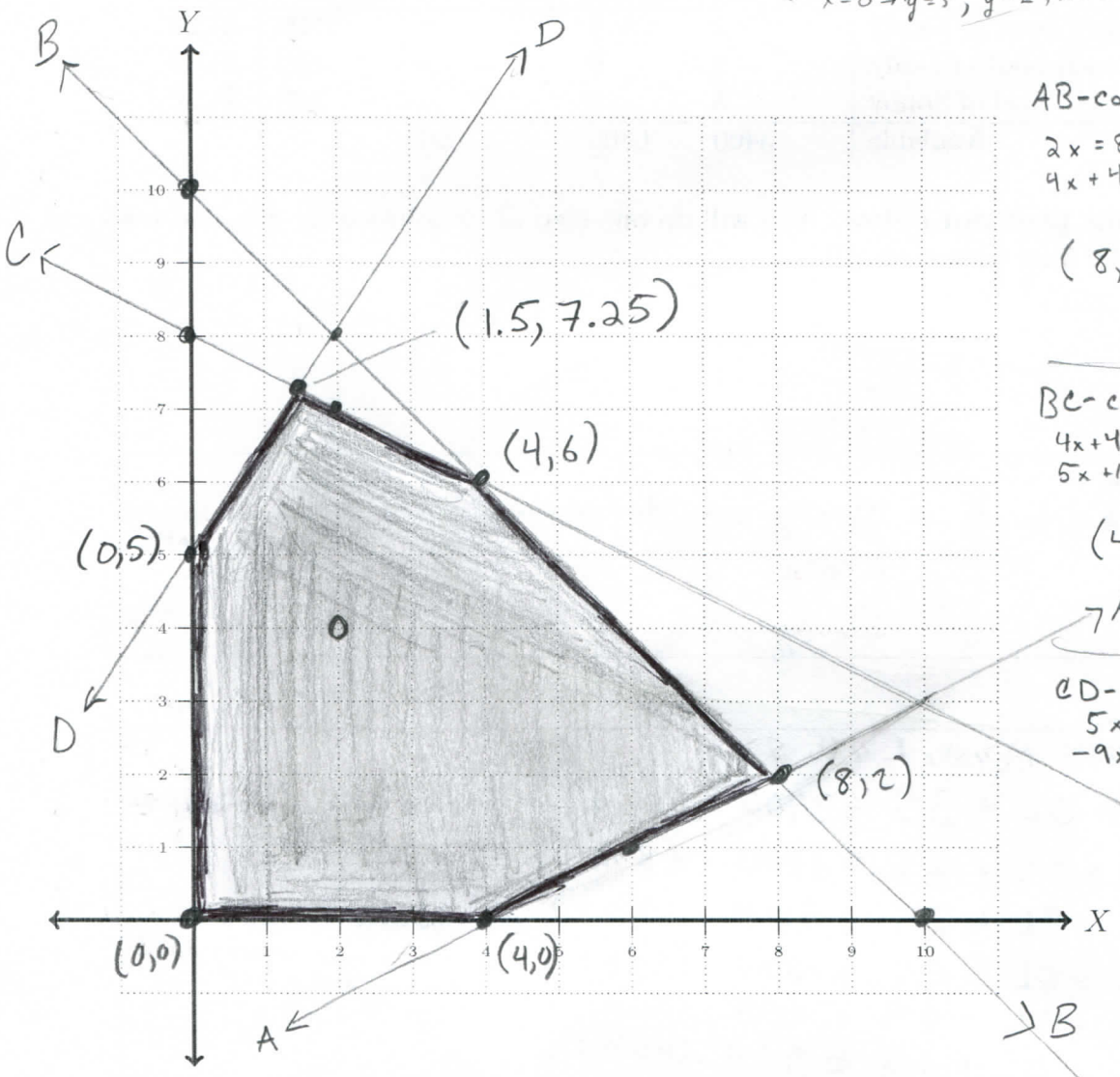
Maximize $S = 2x + 3y$ subject to $\begin{cases} A: 2x \le 8 + 4y \\ B: 4x + 4y \le 40 \\ C: 5x + 10y \le 80 \\ D: 6y \le 9x + 30 \end{cases}$ and $x \ge 0,\ y \ge 0.$

$y=0 \to x=4$; $y=1, x=6$

$x=0 \to y=10$; $y=0, \to x=10$

$x=0 \to y=8$; $y=0, x=16$; $x=2 \to y=7$

$x=0 \to y=5$; $y=2, x=2$; $x=2 \to y=8$



AB-corner

$2x = 8 + 4y$, $4x + 4y = 40$ $\to$ $2x - 4y = 8$, $4x + 4y = 40$

$6x = 48$

$x = 8$

$y = \frac{40 - 4(8)}{4}$

$y = 2$

$(8, 2)$

BC-corner

$4x + 4y = 40$, $5x + 10y = 80$ $\to$ $5x + 5y = 50$, $5x + 10y = 80$

$5y = 30$

$y = 6$

$x = \frac{40 - 4(6)}{4}$

$x = 4$

$(4, 6)$

CD-corner

$5x + 10y = 80$, $-9x + 6y = 30$ $\to$ $15x + 30y = 240$, $-45x + 30y = 150$

$60x = 90$

$x = 1.5$

$y = \frac{80 - 5(1.5)}{10}$

$y = 7.25$

Is this region bounded or unbounded? Bounded. 6 corners, 6 edges

Which region? Probably the one containing $(2, 4)$ ✓

$A: 2(2) \le 8 + 4(4)$ ✓

$B: 4(2) + 4(4) \le 40$ ✓

$C: 5(2) + 10(4) \le 80$ ✓

$D: 6(4) \le 9(2) + 30$ ✓

$2 \ge 0,\ 4 \ge 0$ ✓