HW1
Answer Key

Section 2.2 # 6, 10[a-d]
Section 2.3 #1, 9, 11

(6)

		A	B	
	Product X	50%	40%	$10/gal
Composition	Product Y	20%	10%	$21 gal
Requirements		≥ 30%	≥ 30%	

CORRECT MODEL ▷

minimize $10x + 2y$
Subject to
$x + y = 100$
$.5x + .2y \geq 30$
$.4x + .1y \geq 30$
$x, y \geq 0$

a.) The constraints in a) are incorrect. To use the constraints given, you would also need $x+y=1$. Furthermore, you must test all corner points to be sure of which minimizes $10x + 2y$

b.) $x=0$, $y=0$ does satisfy the constraints, but this model is also incorrect.

c.) See above

(10) a)

	A	B	C	Cost
Feed X	2/lb	5/lb	7/lb	80¢/lb
Feed Y	3/lb	1/lb	.2/lb	30¢/lb
Required	550	600	820	minimize

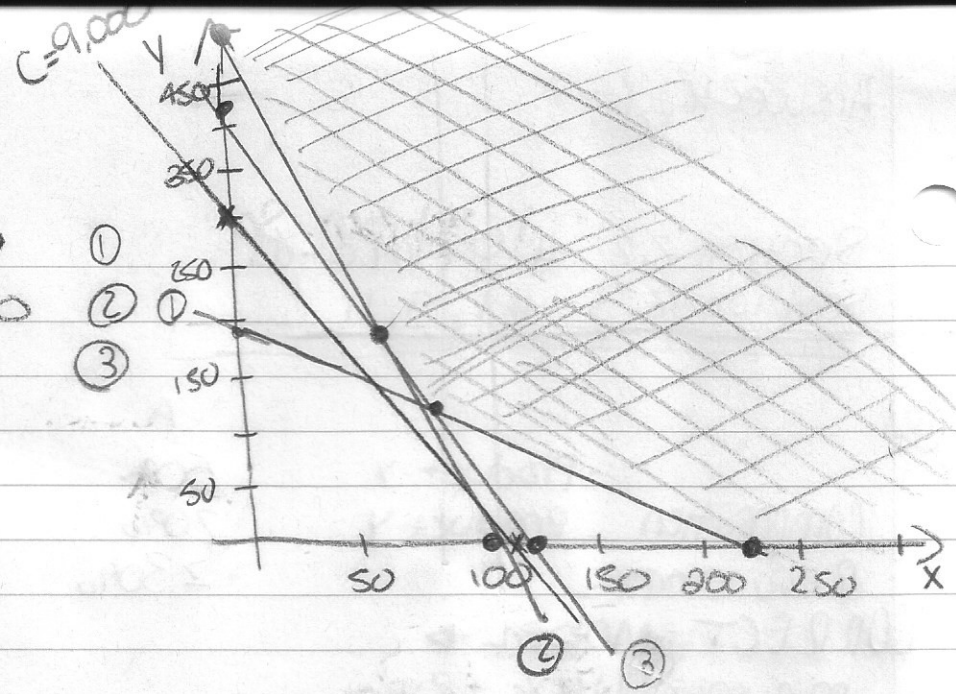
minimize $80x + 30y$
Subject to:

$2x + 3y \geq 550$ ①

$5x + 1y \geq 500$ ②

$7x + 2y \geq 820$ ③

$x, y \geq 0$



Try $C = 9{,}000$

Cost line will intersect first with the corner at the intersection of ① and ③

$2x + 3y = 550$

$7x + 2y = 820$

$-4x - 6y = -1100$

$21x + 6y = 2460$

$17x = 1360$

$x = 80$

$y = 130$

b) $-7/2 \leq -c_1/c_2 \leq -2/3$

$2/3 \leq c_1/c_2 \leq 7/2$

c) $2/3 \leq c_1/30 \leq 7/2$

$20 \leq c_1 \leq 105$

c_1 can increase to 105¢/lb before the optimal point changes

The new optimal part would be at the intersection of ② and ③

$x = 60$

$y = 200$

d) The original solution satisfies this constraint..
$X = 80$ $\quad X = 80 < 215$
$Y = 130$

Section 2.3

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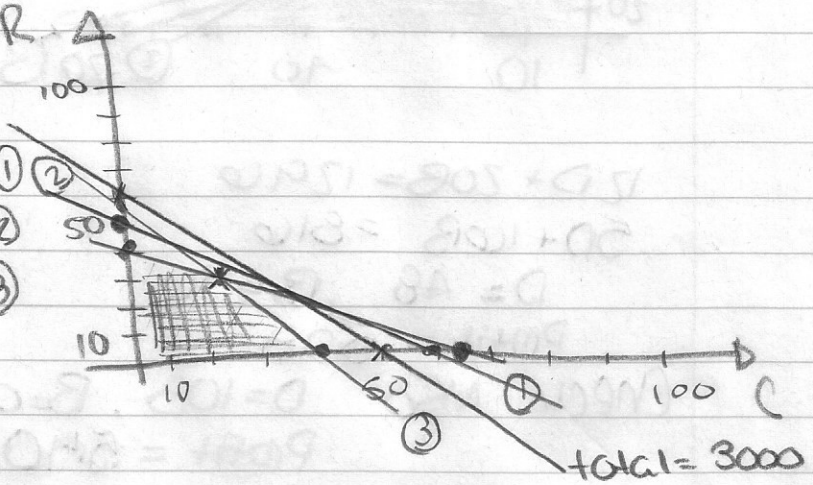
① maximize $50R + 60C$
Subject to:
$50R + 30C \leq 2000$ ①
$6R + 5C \leq 300$ ②
$3R + 5C \leq 200$ ③
$R, C \geq 0$



consider: total = 3000
will intersect the shaded region first at the intersection of ① and ③

$50R + 30C = 2000$
$3R + 5C = 200$ $\quad -18R - 30C = -1200$

$32R = 800$
$R = 25$

$R = 25$
$C = 25$

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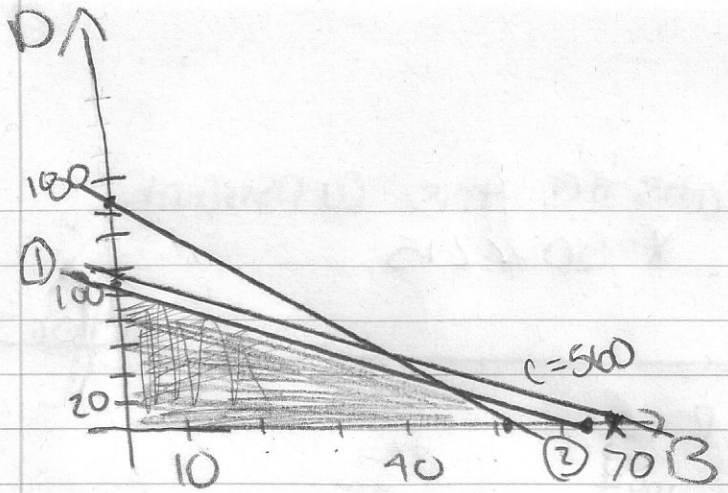
⑨ B = Box of Brownies
D = Dozen Bran Muffins
Maximize $5D + 8B$
Subject to:
$12D + 20B \leq 1296$ ①
$5D + 16B \leq 816$ ②
$D, B \geq 0$



5D+8B

$12D + 20B = 1296$

$5D + 16B = 816$

$D = 48, B = 36$

Profit = 528

Check ABO $D = 108, B = 0$

Profit = 540

$D = 108$
$B = 0$

(11) maximize $8R + 60T + 45S$

Subject to: $2R + 12T + 15S \leq 1500$

$R + 8T + 6S \leq 920$

$R, T, S \geq 0$