A small business produces maple chairs and walnut chairs. $m = \#$ map chairs
$w = \#$ wal chairs

- The business can make at most 20 chairs per week
- Materials cost $100 per maple chair and $150 per walnut chair
- The budget for materials is $2400 per week
- Maple chairs sell for $400 each and Walnut chairs sell for $500 each

Write and graph a system of inequalities to find how many of each type of chair the business should make and sell per week in order to maximize their income.

$$400m + 500w = I$$

$m \geq 0$
$w \geq 0$

$m\text{-}INT = 20$
$w\text{-}INT = 20$
$$m + w \leq 20$$

$$100m + 150w \leq 2400$$
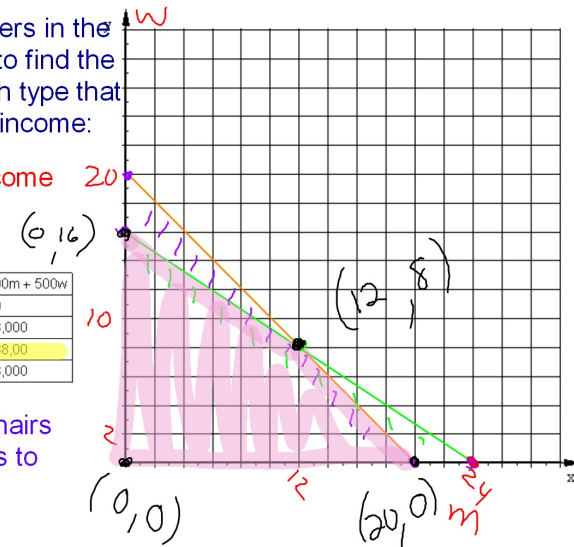$m\text{-}INT = 24$
$w\text{-}INT = 16$

Test the four corners in the Income equation to find the # of chairs of each type that will maximize the income:

$$400m + 500w = \text{Income}$$

# of maple chairs	# walnut chairs	400m + 500w
0	0	$0
20	0	$8,000
12	8	$88,00
0	16	$8,000

Make 12 maples chairs and 8 walnut chairs to maximize income.

$(0,16)$ $(12,8)$ $(0,0)$ $(20,0)$ m

Advertising on a radio station for a 30 sec commercial is: $200 in the morning (am) and $50 in the evening(pm). Your advertising budget is $2200 and you can run at most 20 ads.

A morning ad is heard by 90,000 people and an evening ad is heard by 30,000 people.

Find the number of morning ads and evening ads that will maximize the number of people who can reach.

$a = \# $ am ads
$p = \# $ pm ads

$a \geq 0$
$p \geq 0$

$a\text{-}INT = 11$
$p\text{-}INT = 44$
$$200a + 50p \leq 2200$$
$$a + p \leq 20$$
$a\text{-}INT = 20$
$p\text{-}INT = 20$

Test the four corners in the Listeners equation to find the max # of listeners:

$$L = 90{,}000a + 30{,}000p$$

am ads	pm ads	90,000a + 30,000p
0	2	600,000
8	12	1,080,000
11	0	990,000
0	0	0

purchase 8 am ads and 12 pm ads to maximize the # of listeners.

$(0,20)$ $(8,12)$ $(0,0)$ $(11,0)$