

WARM UP - use graph paper

e.g., *Problem:* A library is buying both hardcover and paperback books. It plans to purchase at most four times as many paperbacks as hardcover books. Altogether the plan is to purchase no fewer than 200 books. Hardcover books average \$35.75 in cost while paperbacks average \$12.20. How can the library minimize its costs?

Solution: Let x represent the number of hardcover books. Let y represent the number of paperback books. Let C represent the total cost of the books.

Objective function to minimize: $C = 35.75x + 12.2y$

Constraints and restrictions:

$$\{(x, y) \mid x + y \geq 200, x \in \mathbb{W}, y \in \mathbb{W}\}$$

$$\{(x, y) \mid 4x \geq y, x \in \mathbb{W}, y \in \mathbb{W}\}$$

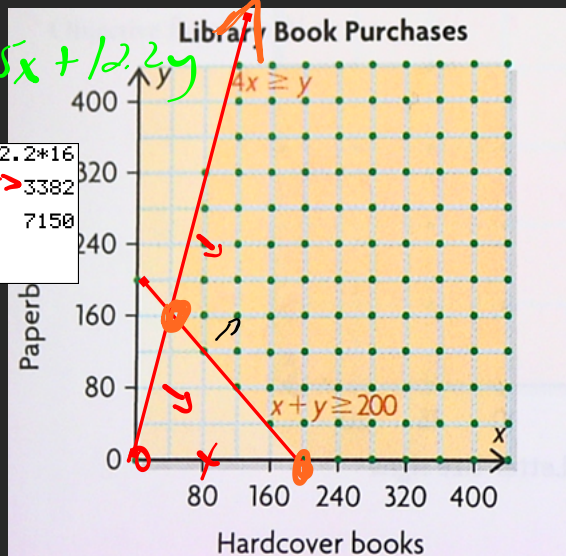
$$y \leq 4x$$

$$y = 4x$$

$$\begin{array}{r} x \mid y \\ 0 \mid 0 \\ \hline 100 \mid 400 \end{array}$$

Vertex $C = 35.75x + 12.2y$
 $(40, 160)$
 $(200, 0)$

$35.75 \cdot 40 + 12.2 \cdot 160$	3382
$35.75 \cdot 200$	7150



Test $(80, 0)$
 $y \leq 4x$
 $0 \leq 32$
 $0 \mid 4(80)$
 $0 \mid 320$
 yes

The library should purchase 40 hardcover books and 160 paperback books, for a total cost of \$3382.00.

ONE MORE...

Malia and Lainey are baking cupcakes and banana mini-loaves to sell at a school fundraiser...

- No more than 60 cupcakes and 35 mini-loaves can be made each day.
- Malia and Lainey can make no more than 80 baked goods, in total, each day.
- It costs \$0.50 to make a cupcake and \$0.75 to make a mini-loaf.

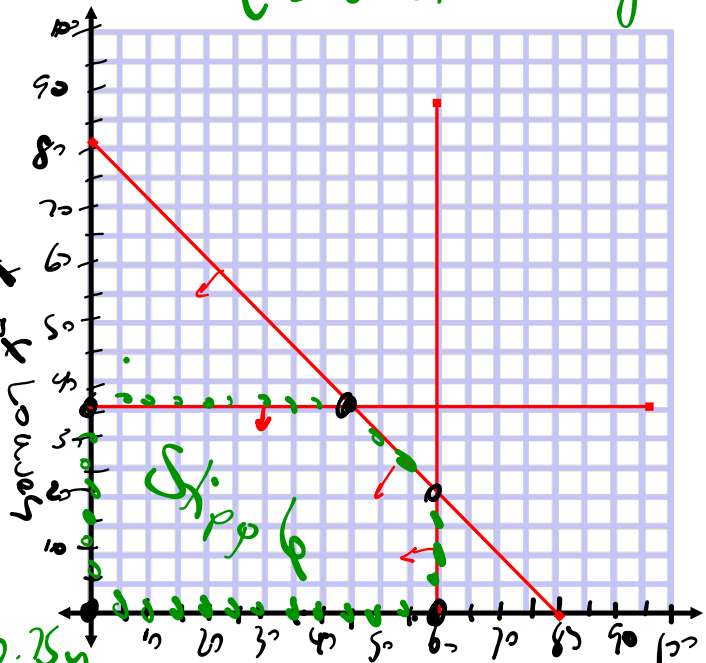
Determine the minimum cost to produce the baked goods.

$x \rightarrow$ # of cupcakes $x \in \mathbb{W}$

$y \rightarrow$ # of loaves $y \in \mathbb{W}$
 $C \rightarrow$ cost in total

$x \leq 60$
 $y \leq 35$
 $x + y \leq 80$

$C = 0.50x + 0.75y$



$x=60$
vertical

$x+y=80$
 x -int $(80,0)$
 y -int $(0,80)$

$y=35$
horizontal

Vertices

$C = 0.50x + 0.75y$

- Min. x
- ~~$(0,0)$~~
 - $(0,35)$
 - $(60,0)$
 - ~~$(80,20)$~~
 - ~~$(45,35)$~~

$.75 \cdot 35$	26.25
$0.5 \cdot 60$	30

of cupcakes
 Cost is \$26.25

HOMEWORK: Test is on THURSDAY!!!

*** CHECK AND CORRECT your quiz...

Review/Practice Questions...

- p. 239: Mid-Chapter Review (Frequently Asked Questions)
- p. 241: Mid-Chapter Practice Questions
- p. 266: Chapter Review (Frequently Asked Questions)
- p. 267: Chapter Practice Questions
- p. 265: Chapter Self-Test (Do this AFTER you practice)