

p163/#4

Vitamin Prob

Let $x = \#$ daily units of A
 $y = \#$ " " " B

a) $.06x + .05y = C$

b) $x \leq 600$

$y \leq 500$

$400 \leq x + y \leq 1000$

$y \geq \frac{1}{2}x$

$y \leq 3x$

$x + y = 1000$ (500, 500) (400, 600)
 $y = -x + 1000$

c) feasible doses

d) i) $.06x + .05y = 60 \rightarrow y = -\frac{6}{5}x + 1200$

ii) $.06x + .05y = 30 \rightarrow y = -\frac{6}{5}x + 600$

iii) $.06x + .05y = 15 \rightarrow y = -\frac{6}{5}x + 300$

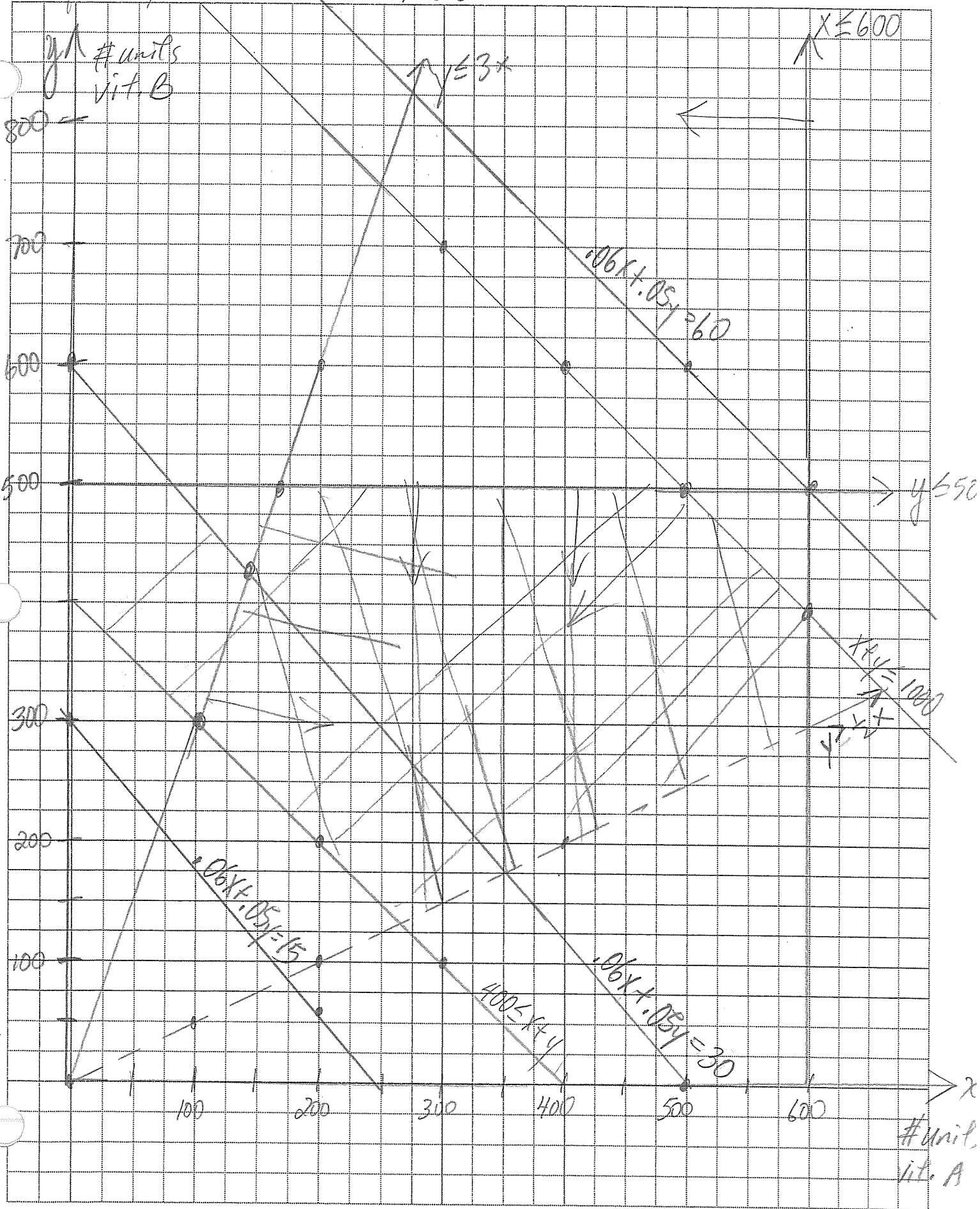
e) 60¢/day - NO; line outside of feasible region
30¢/day - Yes, line inside of " "
15¢/day - No, line outside " "

f) The word is "optimum" point.
Point is (100, 300).

$C = .06(100) + .05(300)$

Min. = 21¢/day.

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p167/#9 Linear Programming

Let $x = \#$ of dozen C.C. cookies
 $y = \#$ of " oat. b. "

$x \leq 20$

$y \leq 40$

$x + y \leq 50$

$y \leq 3x \rightarrow (10, 30) (20, 60) (0, 0)$

$x + 1.5y = P$

	Vertices	Profit $x + 1.5y = P$
A(0,0)	(0,0)	0
B(12.50, 37.50)	(12.50, 37.50)	68.75 ←
C(20, 30)	(20, 30)	65
D(20, 0)	(20, 0)	20

Answer:
 12½ dz. ch. chip
 37½ dz. oat. b.
 \$68.75

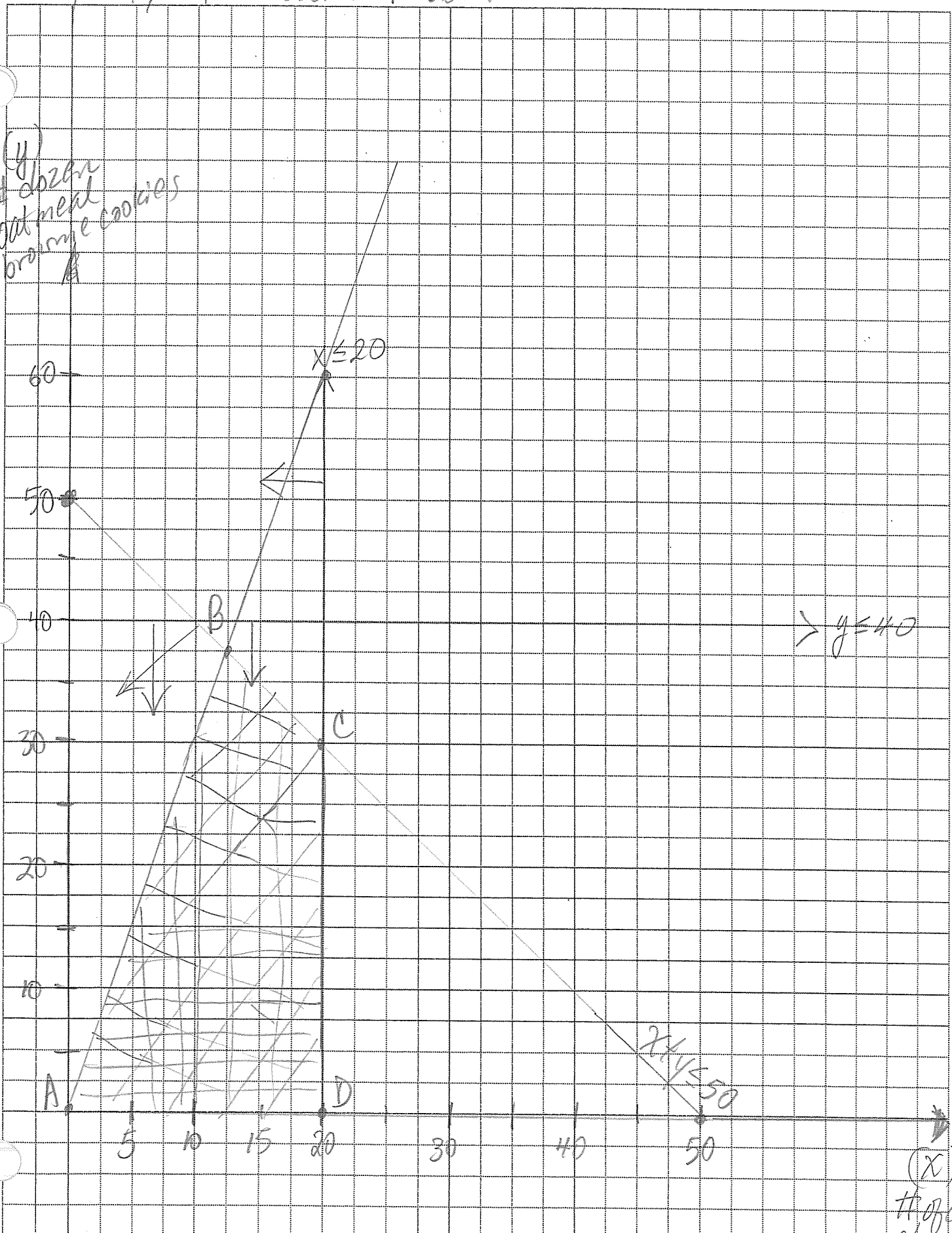
12.50 → 13	(13, 37)	✓ \$68.50
→ 12		
37.50 → 37	(12, 38)	→ fails $y \leq 3x$
→ 38		

unnecessary because text had answers in ½ dozens.

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Cookie Problem

(y)
dozen
oatmeal
brownie cookies



$y \leq 40$

$x + y \leq 50$

(x)
of dozen
choc chip
cookies

P167/#10 Christmas Tree

let $x = \#$ of real trees
 $y = \#$ of artificial trees

$20 \leq x \leq 90$
 $y \leq 100$

$50 \leq x+y \leq 120$ → $x+y \leq 120$
 (30, 90) (50, 70) (70, 50)

$y \geq \frac{1}{2}x$ → $x+y \geq 50$
 (0, 50) (50, 0)

$80x + 160y = C$ → $y = \frac{1}{2}x$
 (20, 10) (60, 30)

Vertices	Cost $80x + 160y = C$	(real, art.)	minimum feasible amt.
(20, 30)	6400	33, 16	X b/c less than 50
(20, 100)	17,600	33, 17	5360
(80, 40)	12,800	34, 16	X fails $y \geq \frac{1}{2}x$
$(\frac{100}{3}, \frac{50}{3})$	5333.33	34, 17	5440

→ $x+y=50$
 $y = \frac{1}{2}x$

$x + \frac{1}{2}x = 50$

$\frac{3}{2}x = 50$

$x = \frac{100}{3}$

$y = \frac{1}{2} \cdot \frac{100}{3} = \frac{50}{3}$

$80(\frac{100}{3}) + 160(\frac{50}{3}) = C$

$\frac{8000}{3} + \frac{8000}{3} = C$

$\frac{16000}{3} = C$

5333.

Answers

33 real
 17 artificial
 \$5360 minimum

Marica should buy 33 real and 17 artificial trees and invest \$5360.

p167/#10 Christmas Tree Probl.

