Foundations of Math 11

p. 303 #5acdf, 6cf, 7, 9

5. a) $y > -2x + 8$

slope $= \frac{-2}{1}$ y-intercept $= 8$

dotted line

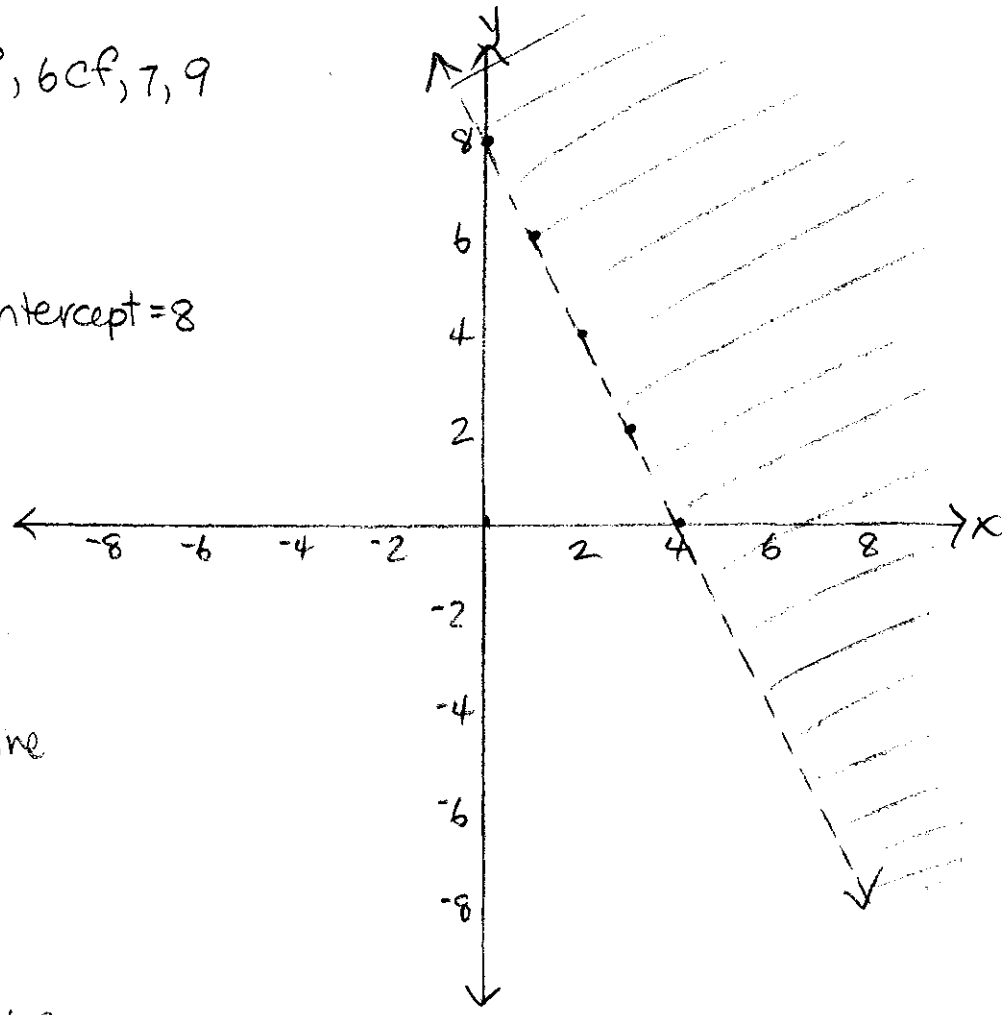
use (0,0)

$0 > -2 \cdot 0 + 8$

$0 > 0 + 8$

$0 > 8$ false

so shade on other side of line

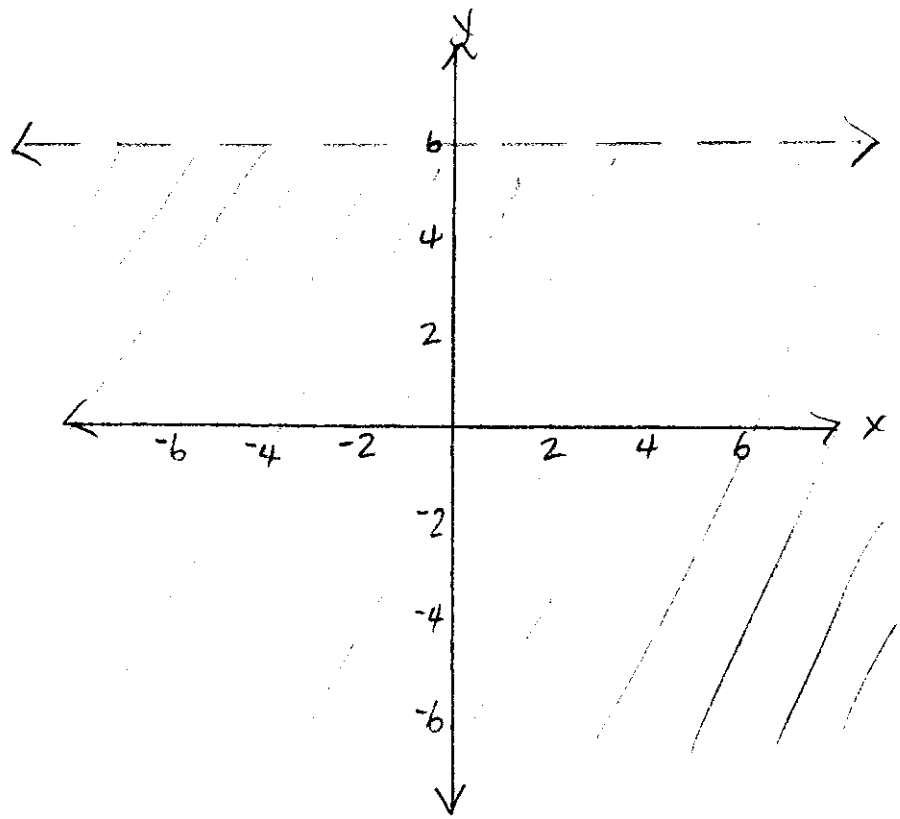


c) $y < 6$

no x so horizontal line

dotted line

don't need to pick a point because y is less than 6 so it has to be below the line



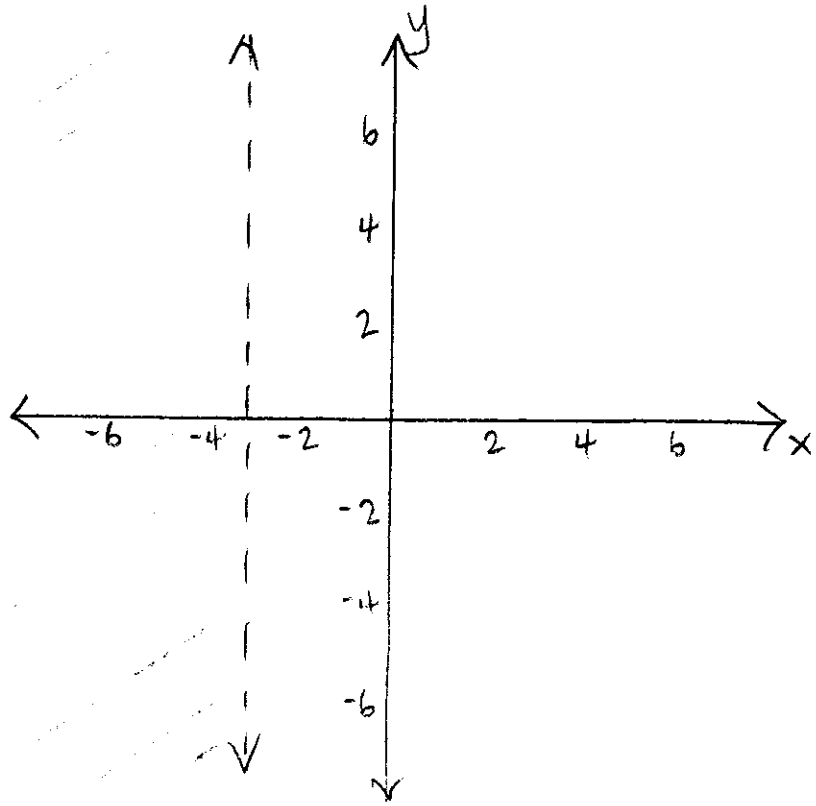
p. 303 cont.

5. d) $-4x - 8 > 4$

$-4x > 12$

$x < -3$

remember: when you multiply or divide both sides of an inequality by a negative number, you need to reverse the sign



no y in the inequality so it is a vertical line

"less than" so shading is to the left of -3

f) $4x + 3y \geq -12$

$3y \geq -4x - 12$

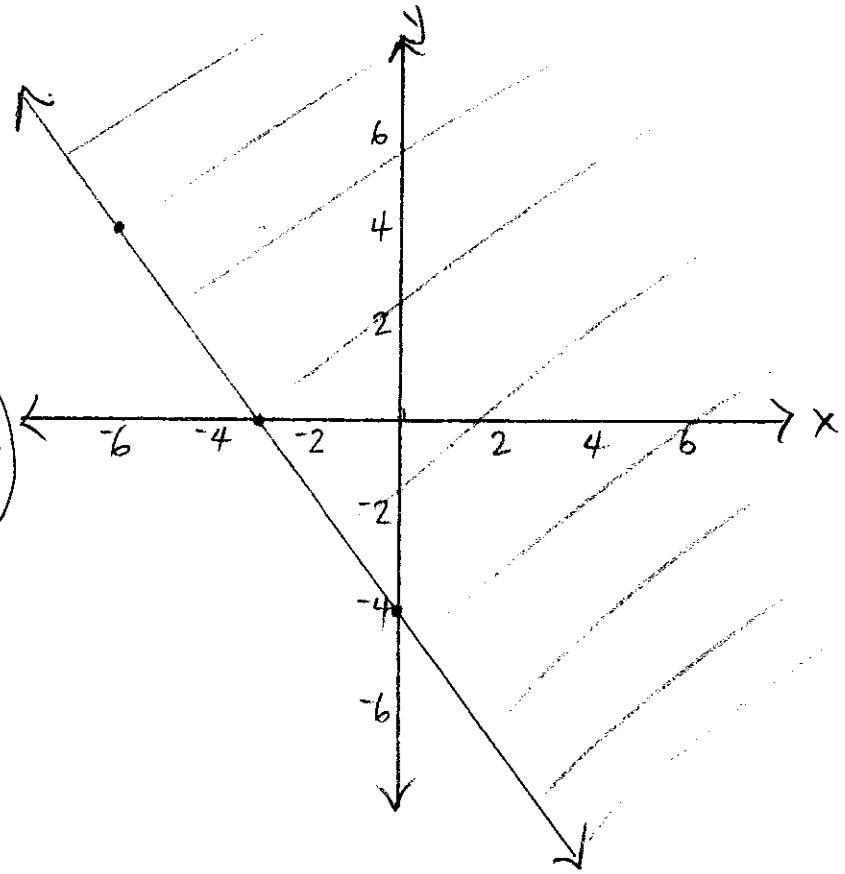
$y \geq -\frac{4}{3}x - 4$

solid line

slope = $\frac{4}{3}$ $\frac{\text{up}}{\text{across}}$

left because of the negative

y-intercept = -4



pick point (0,0)

$4 \cdot 0 + 3 \cdot 0 \geq -12$

$0 + 0 \geq -12$

$0 \geq -12$

true so shade where (0,0) is

p. 303 cont.

6. c) $\{(x,y) \mid 5x-y \leq 4,\ x \in W,\ y \in W\}$

W means "whole numbers" – no fractions or decimals

$5x-y \leq 4$

$5x \leq y+4$

$5x-4 \leq y$

pick point (0,0)

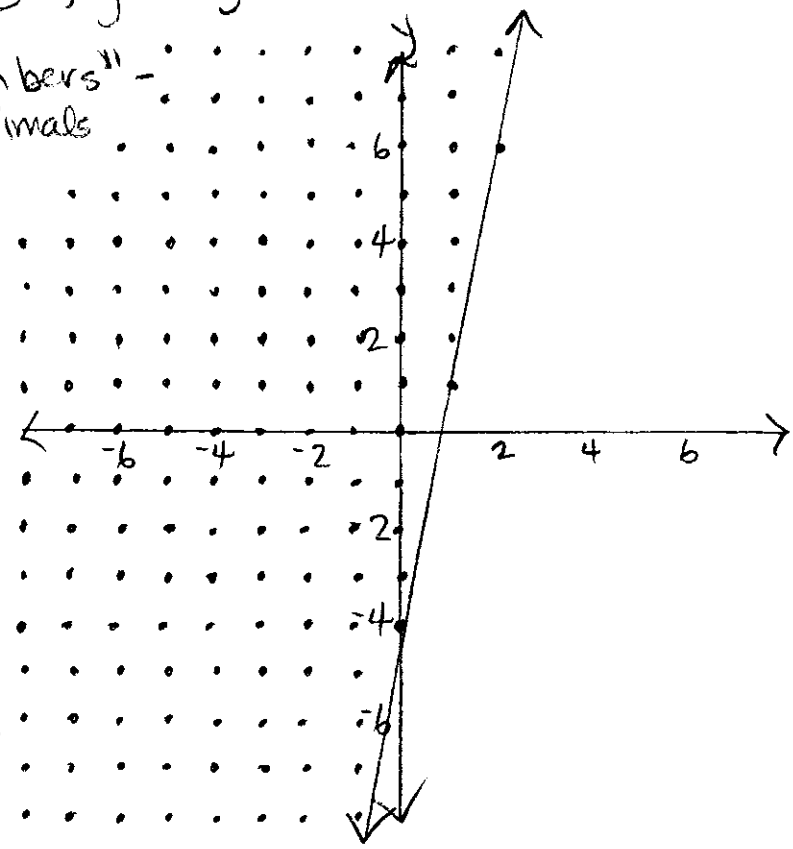
$5 \cdot 0 - 0 \leq 4$

$0-0 \leq 4$

$0 \leq 4$

true

answer is whole numbers only



f) $\{(x,y) \mid 4x-5y < 10,\ x \in R,\ y \in R\}$

Real Number

$4x-5y < 10$

$4x-10 < 5y$

$\frac{4}{5}x-2 < y$

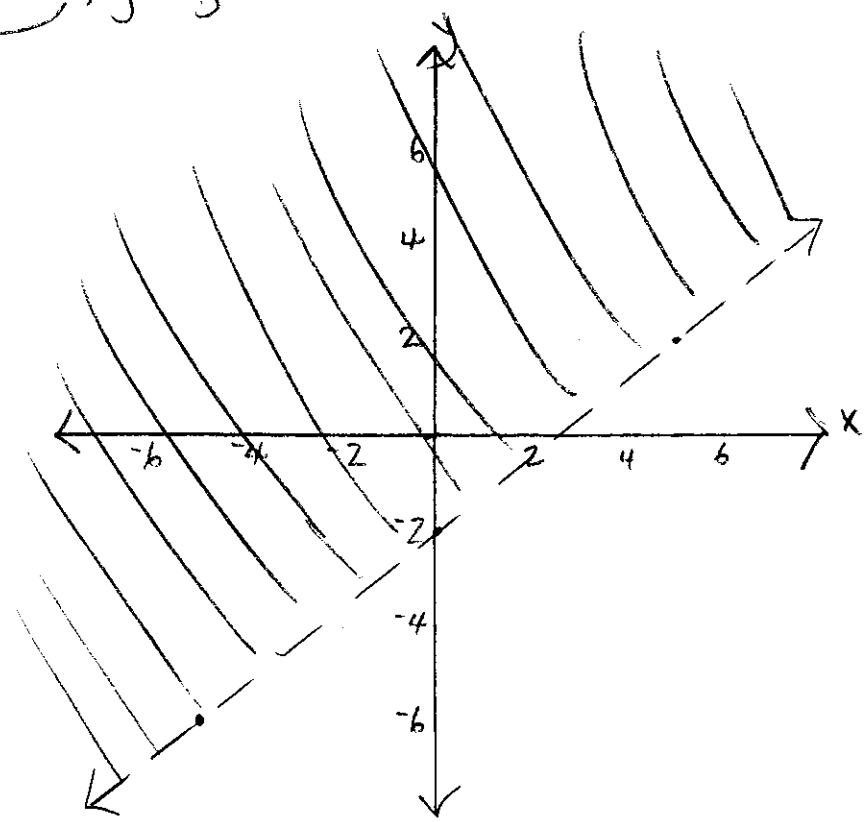
pick point (0,0)

$4 \cdot 0 - 5 \cdot 0 < 10$

$0-0 < 10$

$0 < 10$

true



p.303 cont.

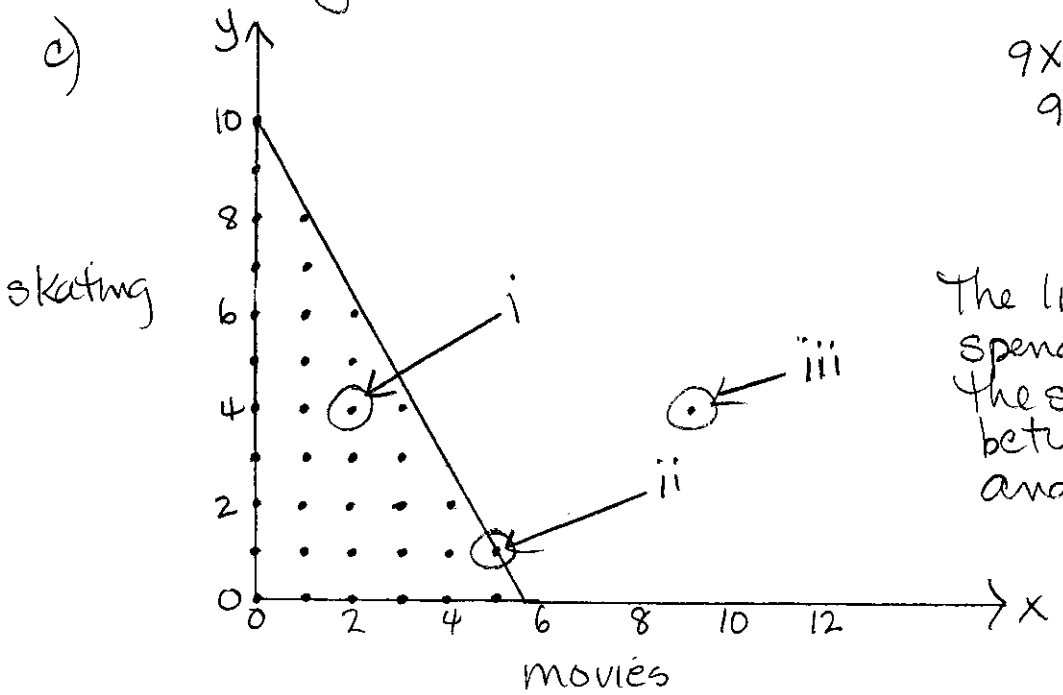
7. budgets no more than $75 per month
movie $9 per ticket
skating $5 per time
bus pass $25

a) Let x be the number of movie tickets
Let y be the number of skating times

$$9x + 5y + 25 \leq 75$$

b) The restrictions on x and y are:
① they must be positive or zero
② they must be whole numbers

c)



$9x + 5y + 25 \leq 75$
$9x + 5y \leq 50$
$5y \leq -9x + 50$
$y \leq -\frac{9}{5}x + 10$

The line represents spending $75 so the solution is between the line and (0,0)

i) In order to have money left over she will need to have the values of the points not on the line
eg. 2 movies + 4 skating times
ii) To have no money left over she would need to select a point on the line. eg. 5 movies + 1 skating time
iii) Any "points" above or to the right of the line would exceed her budget, eg. 9 movies + 4 skating times

p. 303 cont.

9. each teddy bear sold → $10 to charity
each ticket sold → $32 to charity
need to raise at least $5000

a) Let x be teddy bears sold
Let y be tickets sold

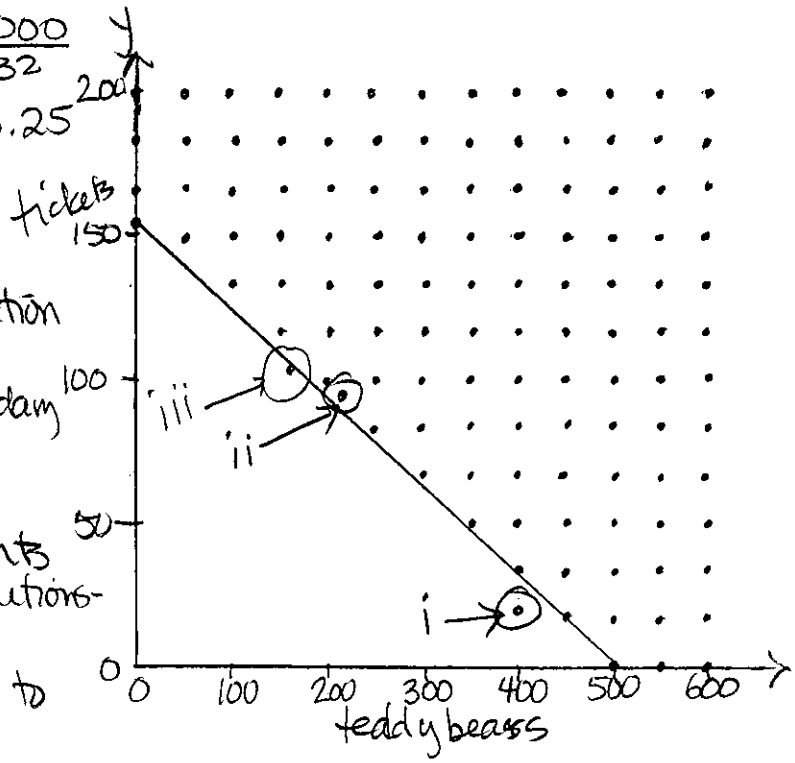
$10x + 32y \geq 5000$

b) Variables must be whole numbers (positive and zero or greater) because you can only sell whole teddy bears or whole tickets.

c) $10x + 32y \geq 5000$
$32y \geq -10x + 5000$
$y \geq -\frac{10}{32}x + \frac{5000}{32}$
$y \geq -\frac{5}{16}x + 156.25$

must be at least $5000 so solution is above and to the right of the boundary line

There is more points between these solutions- there is just too many possibilities to show them all.



(teddy bears, tickets)

i) (400, 20) no

ii) (205, 98) yes

iii) (156, 105) no