

6.5

## Foundations of Math II

P. 334 #1-3

1. The maximums and minimums are found at the corners of the solution space so try each corner point in the objective function

a)  $(-4, 3)$

$T = 2(-4) + 5(3)$

$T = -8 + 15$

$T = 7$

$(-4, -12)$

$T = 2(-4) + 5(-12)$

$T = -8 - 60$

$T = -68$

$(11, 3)$

$T = 2(11) + 5(3)$

$T = 22 + 15$

$T = 37$

The "empty" circles are on dotted lines so are not part of the solution.

maximum is 37 at  $(11, 3)$

minimum is close to -68 and close to  $(-4, -12)$

b)  $(0, 9)$

$N = 3(0) - 2(18)$

$N = 0 - 36$

$N = -36$

$(5, 4)$

$N = 3(5) - 2(4)$

$N = 15 - 8$

$N = 7$

$(0, 4)$

$N = 3(0) - 2(4)$

$N = 0 - 8$

$N = -8$

All of these points are "empty" circles so the maximum and minimum are near but not on these points.

maximum is near 7, near  $(5, 4)$

minimum is near -36, near  $(0, 9)$

p. 334 cont.

2.

$(-4, 4)$

$$P = -4 - 4$$

$$P = -8$$

minimum

$(4, 2)$

$$P = 4 - 2$$

$$P = 2$$

$(-4, -6)$

$$P = -4 + +6$$

$$P = 2$$

Estimate this by finding the greatest distance between the two values - one positive and one negative will give a big difference

3. a) greatest number of books is the top right vertex

$$50 + 200 = 250$$

that is where the numbers are the highest

b) No, the points for equal numbers of cookbooks and novels are not in the solution space.

c) most cookbooks, fewest novels is at point  $(50, 100)$

d) The longest shelf would be at  $(50, 200)$ .

Shelf length:  $W = 0.5(50) + 0.25(200)$

$$W = 25 + 50$$

$$W = 75 \text{ inches}$$

use objective function

e) The shortest shelf would be at  $(0, 0)$

there would be no shelf and no books.