Good example of two variables inequality essay

ASSIGN BUSTER

Conditions

Maple rockers. Ozark Furniture Company can obtain at most 3000 board feet of maple lumber for making its classic and modern maple rocking chairs. A classic maple rocker requires 15 board feet of maple, and a modern rocker requires 12 board feet of maple. Write an inequality that limits the possible number of maple rockers of each type that can be made, and graph the inequality in the first quadrant.

Solution

First of all we have to name the variables:

Let the amount of classic maple rockers produced by Ozark Furniture Company is x. The amount of modern rockers is y. So, if we produce x units of classic maple rockers, the amount of maple needed is:

15x

And if we produce y units of modern maple rockers, the amount of maple needed is:

12y

The total amount of maple lumber obtained by Ozark Furniture Company is 3000 board feet. So, we have the following constraint related to maple lumber:

$15x + 12y \leq 3000$

Now we create a graph to visualize the ability of producing of maple rockers:

Here the x-axis is the amount of classic rockers and y-axis is the amount of modern rockers.

The solution of inequality is within the triangle bounded by the lines:

x= 0y= 015x+12y= 3000

We also see, that y-intercept is (0, 250) and x-intercept is (200, 0). This means that if the company shall not produce modern rockers, it is able to produce at most 200 classic rockers and if the company shall not produce classic rockers, it is able to produce at most 250 modern rockers.

Let's pick a point within the shaded area. For example, (50, 50). This means that the company decided to produce 50 classic maple rockers and 50 modern maple rockers. This is possible, because:

50*15+50*12= 750+600= 1350≤3000

This point satisfies the inequality.

And if we pick the point outside the shaded area, for example (200, 200), we have the following:

200*15+200*12= 3000+2400= 5400≥3000

This is impossible. The company can't obtain so many feet of maple lumber to produce 200 classic rockers and 200 modern rockers.

Now we solve the problem: if it is possible to satisfy the demand of 175 modern rockers and 125 classic rockers?

175*12+125*15= 3975

This is more than possible amount - 3000 feet of maple lumber. That's why the demand will not be satisfied! The order will not be filled!

Sources

Hardy, G., Littlewood J. E., Pólya, G. (1999). Inequalities. Cambridge Mathematical Library, Cambridge University Press. ISBN 0-521-05206-8.

Beckenbach, E. F., Bellman, R. (1975). An Introduction to Inequalities.

Random House Inc. ISBN 0-394-01559-2.