Name: KEY

Math 125 Test #3

1) Graph the line on graph paper: $-3x + 2y = -2$

$\frac{2y}{2} = \frac{3x - 2}{2}$

$\boxed{y = \frac{3}{2}x - 1}$

SEE GRAPH

2) Graph the inequality on graph paper: $y \leq -\frac{3}{2}x + 6$

$m = -3/2$

$b = 6$

SEE GRAPH

3) a) If you deposit \$850 into and account that gets 5% annual interest compounded monthly, then how much money would you have in the account after 6 years?

$A = 850\left(1 + \frac{.05}{12}\right)^{12(6)}$

$A \approx \$1{,}146.67$

b) How much **interest** will you have made after 15 years?

$A = 850\left(1 + \frac{.05}{12}\right)^{12(15)}$

$A \approx \$1{,}796.65$

$I = 1796.65 - 850 \approx \$946.65$

4) If you have \$15,000 to invest and you need it to be \$21,000 within 12 years, then what simple interest rate would you need to get?

$21{,}000 = 15{,}000 + 15000(r)(12)$

$6000 = 15000r(12)$

$.033 \approx r$

$r = 3.3\%$

5) Joe determined that he needs to have $1,000,000 for when he retires in 30 years. His account earns 4.5% interest annually.

a) How much money would he need to deposit each month into the account for 30 years in order to reach his goal?

$$1{,}000{,}000 = \frac{P\left(\left(1+\frac{.045}{12}\right)^{12(30)} - 1\right)}{\left(\frac{.045}{12}\right)}$$

$$P \approx \$1316.86$$

b) How much total money will he have put into the account?

$$\$1316.86\,(12)(30) \approx \$474{,}069.60$$

c) How much total interest will he have earned after 30 years?

$$1{,}000{,}000 - 474{,}069.60 = \$525{,}930.40$$

6) Michelle knows that she will have $600,000 when she retires in her account. If she sets up a payout annuity for 25 years in an account paying 6% interest, then how much would the annuity provide her each month?

$$600{,}000 = \frac{PMT\left(1-\left(1+\frac{.06}{12}\right)^{-12(25)}\right)}{\left(\frac{.06}{12}\right)}$$

$$PMT \approx \$3865.80$$

7) Jasmine can afford a monthly car payment of $275 a month. She found a 6 year car loan at 3.5% interest.

a) How expensive of a car can she afford for that monthly payment over the 6 years?

$$P = \frac{275\left(1-\left(1+\frac{.035}{12}\right)^{-12(6)}\right)}{\left(\frac{.035}{12}\right)}$$

$$P \approx \$17835.83$$

b) How much total money will she have paid for the car including interest?

$$275(72) = \$19,800$$

c) How much of that money was interest?

$$I = 19800 - 17835.83$$

$$I \approx \$1964.17$$

8) Solve the linear programming problem by graphing (on graph paper) and then determining which vertex maximizes the objective function given. (make sure to label all vertices and shade the feasible region)

Maximize: $A = 10x + 6y$ subject to the constraints below:

$$x \geq 0$$
$$y \geq 0$$
$$y \leq -\frac{1}{3}x + 9$$
$$-2x + 2y \leq -6$$

SEE GRAPH

9) A store sells two types of toys, A and B. The store owner pays ~~$16~~ $7.50 and $15 for each one unit of toy A and B respectively. One unit of toys A yields a profit of $2 while a unit of toys B yields a profit of $3. The store owner estimates that no more than 1800 toys will be sold every month and he does not plan to invest more than $15,000 in inventory of these toys. How many units of each type of toy should be stocked in order to maximize his monthly total profit?

a) Write the Equation to show Profit (Maximum)

$$P = 2A + 3B$$

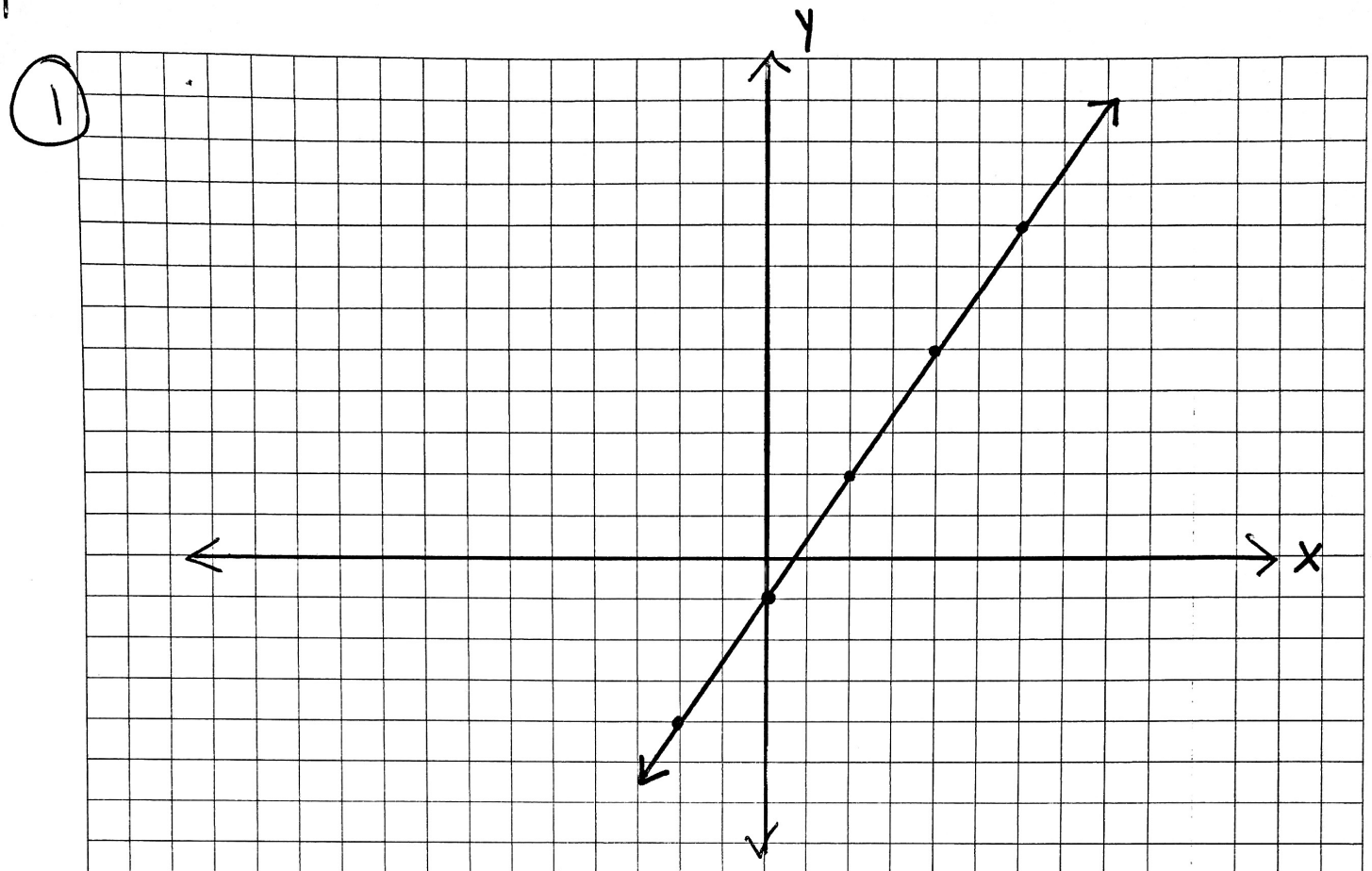
b) Write the **4** Inequalities to show the conditions of the problem (constraints).

$$\begin{cases} A + B \leq 1800 \\ 7.5A + 15B \leq 15000 \\ A \geq 0 \\ B \geq 0 \end{cases}$$

c) Graph the inequalities on the graph paper and find the vertices of the feasible region. Then substitute the values into your Profit equation to find out how many of each toy you should sell in order to maximize the profits.

SEE GRAPH PAPER

1



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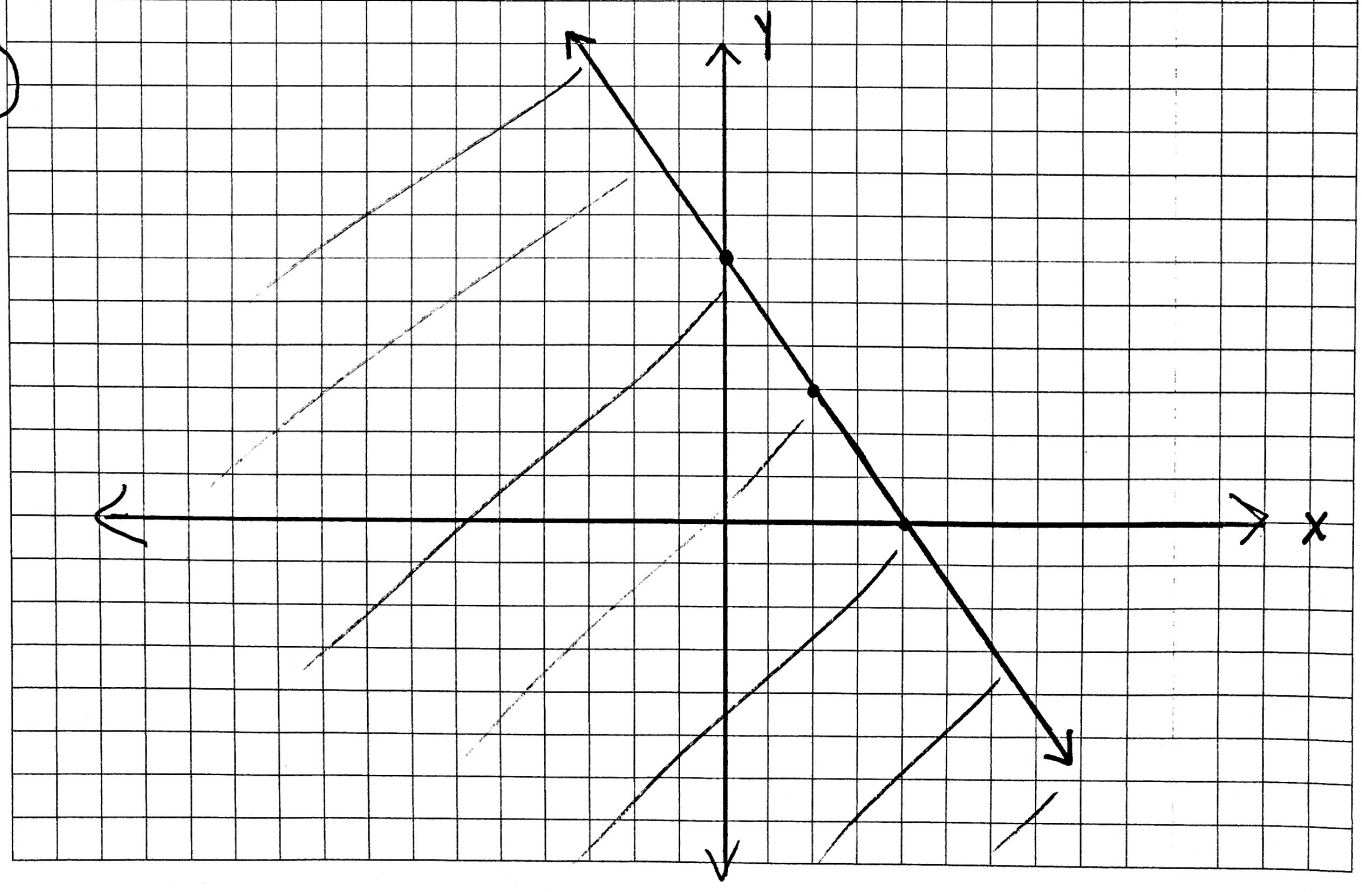
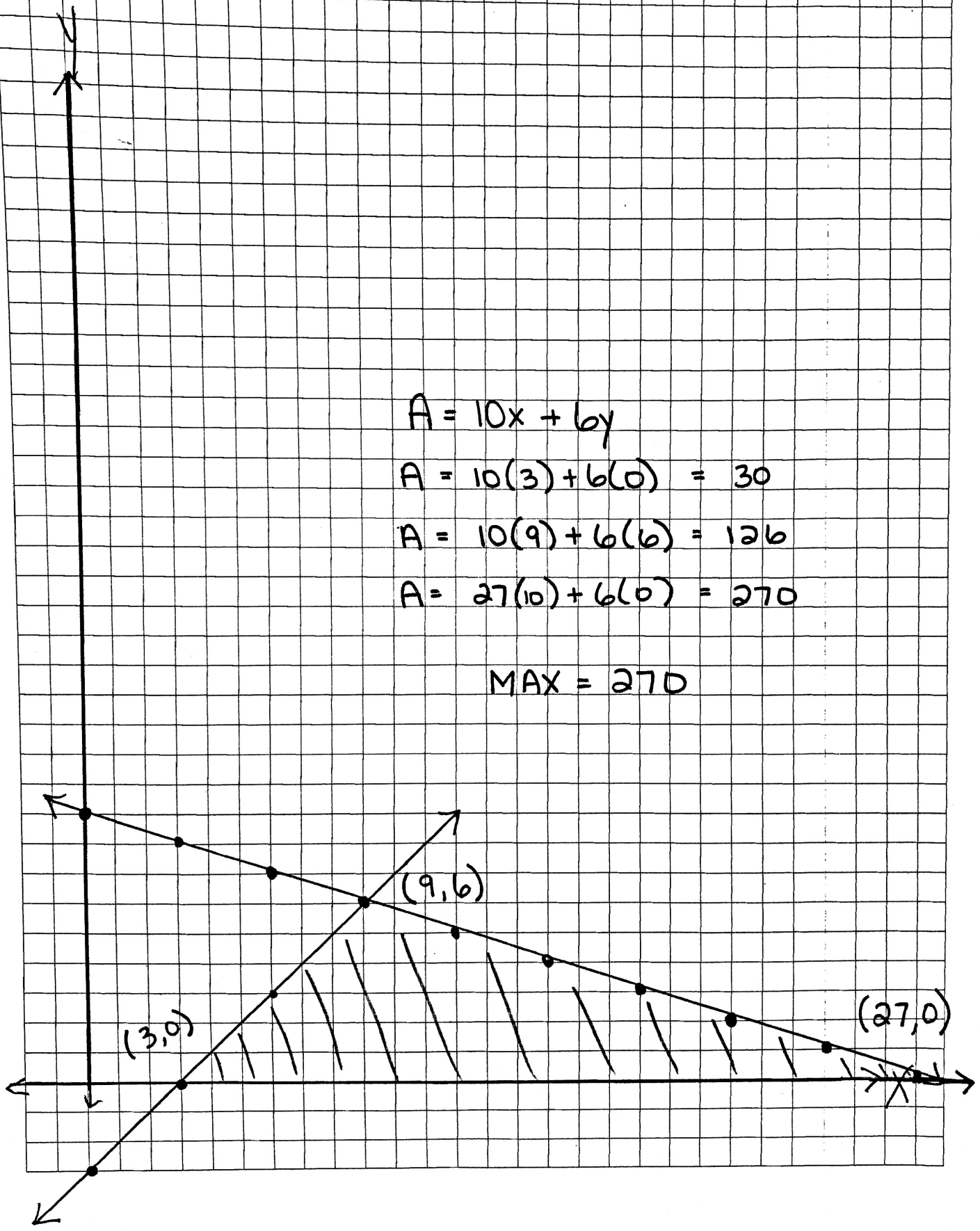


8)



$A = 10x + 6y$

$A = 10(3) + 6(0) = 30$

$A = 10(9) + 6(6) = 126$

$A = 27(10) + 6(0) = 270$

MAX = 270

9

a) $P = 2A + 3B$

$P = 2(0) + 3(1000) = 3000$

$P = 2(1600) + 3(200) = 3800$

$P = 2(1800) + 3(0) = 3600$

MAX PROFIT = $3800