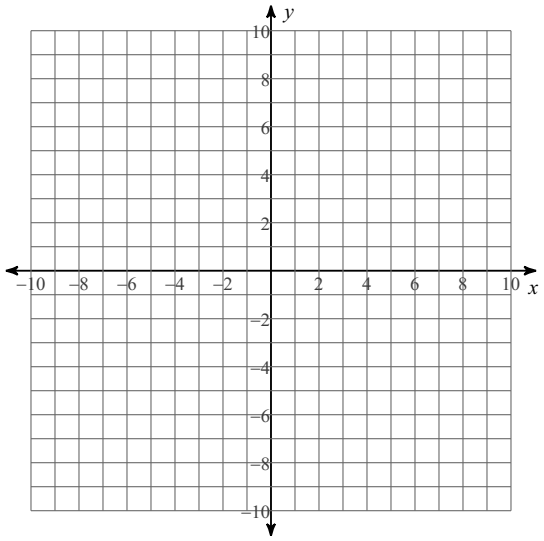
Intermediate Algebra Name_____

Target 1.3 Relearning Packet

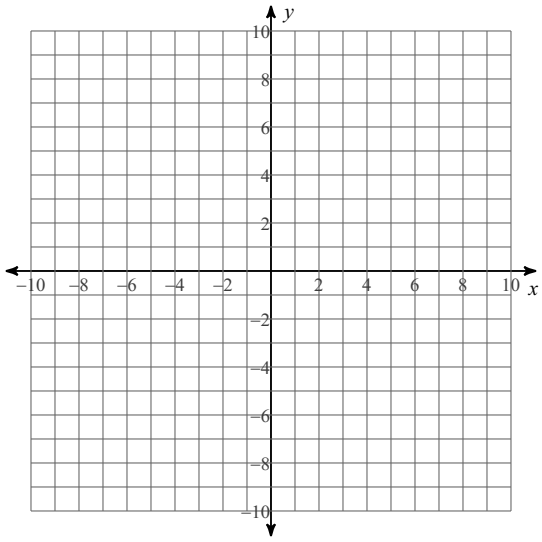
Teacher_____ Period____

Section 1: Sketch the solution to each system of inequalities.

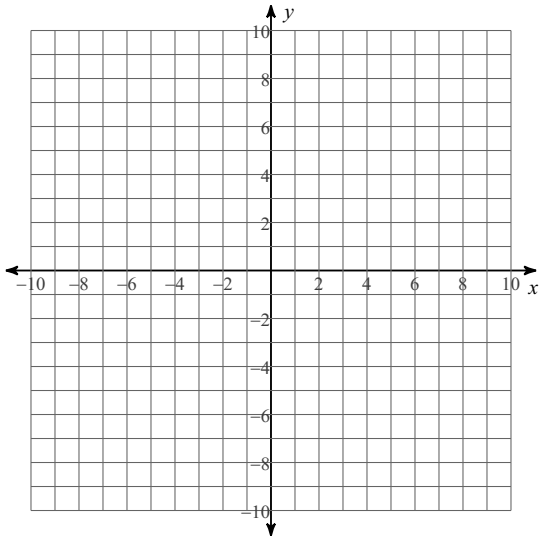
1) $y \geq -x - 7$
$y \leq \frac{9}{4}x + 6$



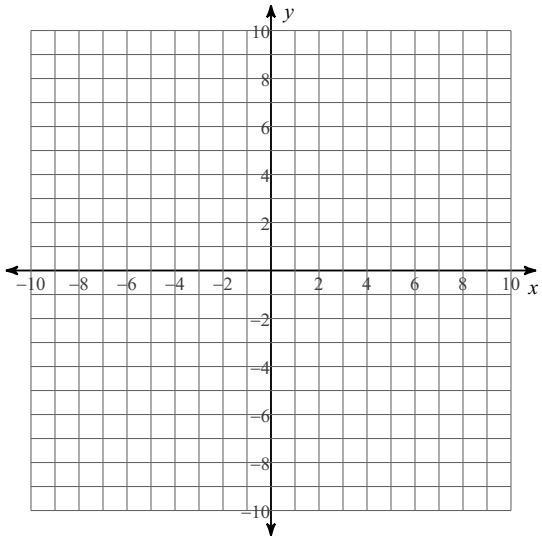
2) $y > -\frac{7}{4}x - 3$
$y > -\frac{1}{4}x + 3$



3) $y \geq -12x - 5$
$y > x + 8$

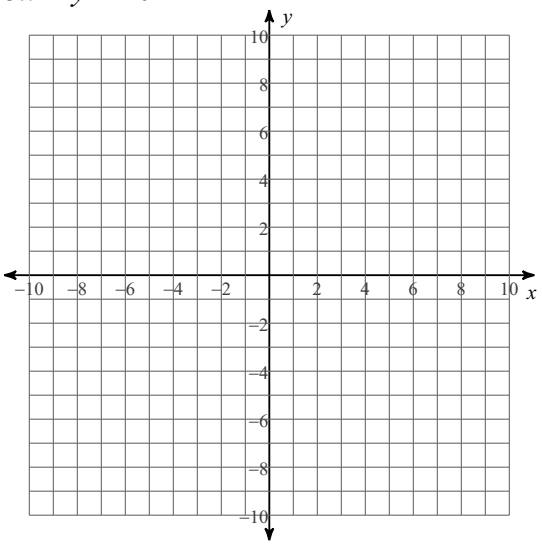


4) $y < -x - 4$
$y < 5x + 2$

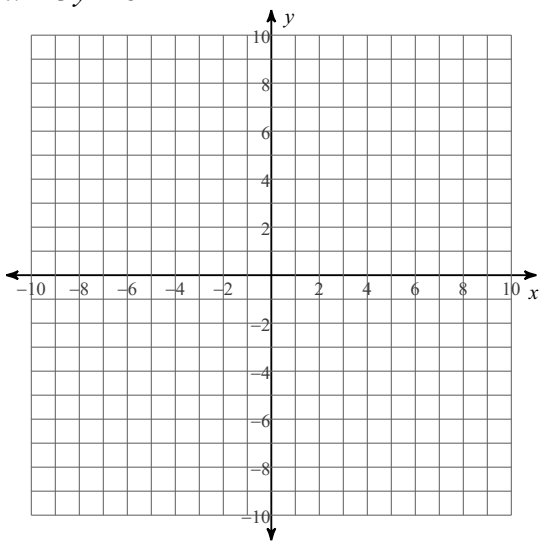


Solve the system of inequalities.

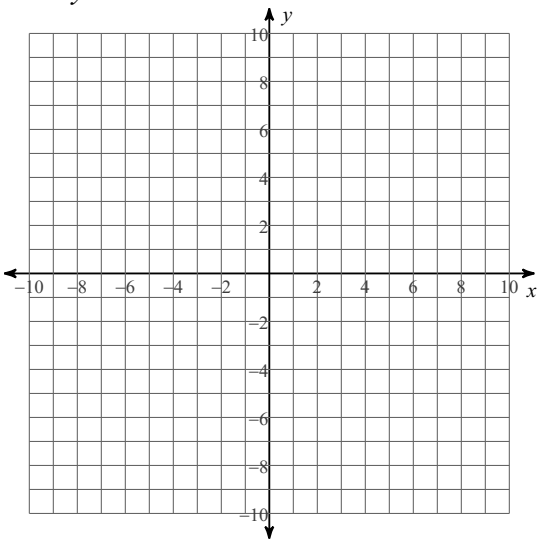
5) $2x - 3y \leq 12$
$5x + y > 10$



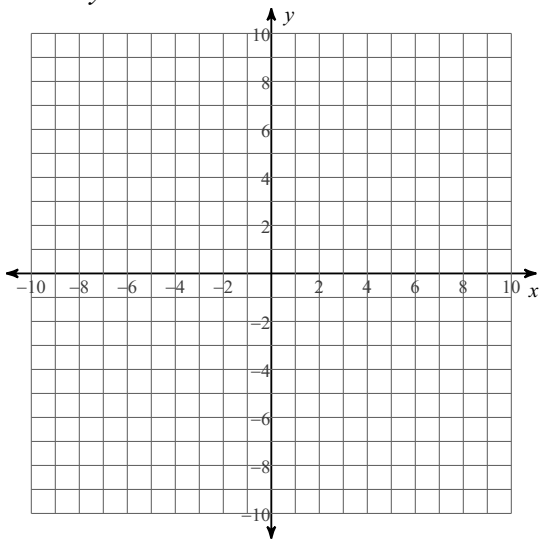
6) $3x - y > 6$
$x - 3y < 6$



7) $x + 5y > -10$
$3x + y \leq 9$



8) $5x + 4y \geq -20$
$2x - 4y \leq 8$



Section 2: Complete each linear programming problem.

9) A farmer has 7 acres to plant in wheat and rye. However, he has only $1200 to spend and each acre of wheat costs $200 to plant and each acre of rye costs $100 to plant. Moreover, the farmer has to get the planting done in 12 hours and it takes an hour to plant an acre of wheat and 2 hours to plant an acre of rye. If he makes $500 per acre of wheat and $300 per acre of rye how many acres of each should be planted to maximize profits?

DEFINE VARIABLES

W = # of acres of wheat

R = # of acres of rye

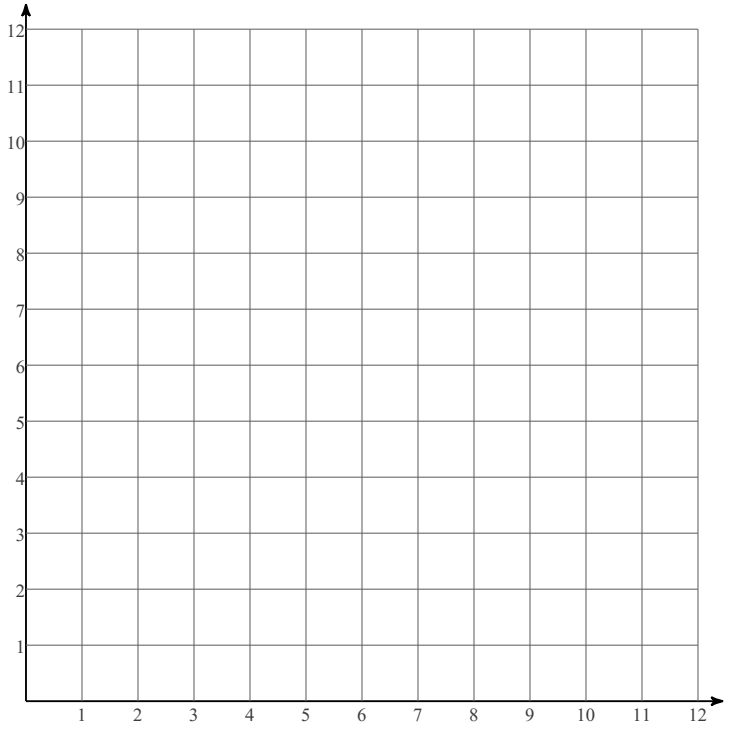
OBJECTIVE: $P = 500W + 300R$

CONSTRAINTS

$W + R \leq 7$

$200W + 100R \leq 1200$

$W + 2R \leq 12$



10) A gold processor has two sources of gold ore, source A and source B. In order to kep his plant running, at least three tons of ore must be processed each day from source A and B combined. Ore from source A costs $20 per ton to process, and ore from source B costs $10 per ton to process. Costs must be kept to less than $80 per day. Moreover, Federal Regulations require that the amount of ore from source B cannot exceed twice the amount of ore from source A. If ore from source A yields 2 oz. of gold per ton, and ore from source B yields 3 oz. of gold per ton, how many tons of ore from both sources must be processed each day to maximize the amount of gold extracted subject to the above constraints?

DEFINE VARIABLES

A = amount of gold from source A

B = amount of gold from source B

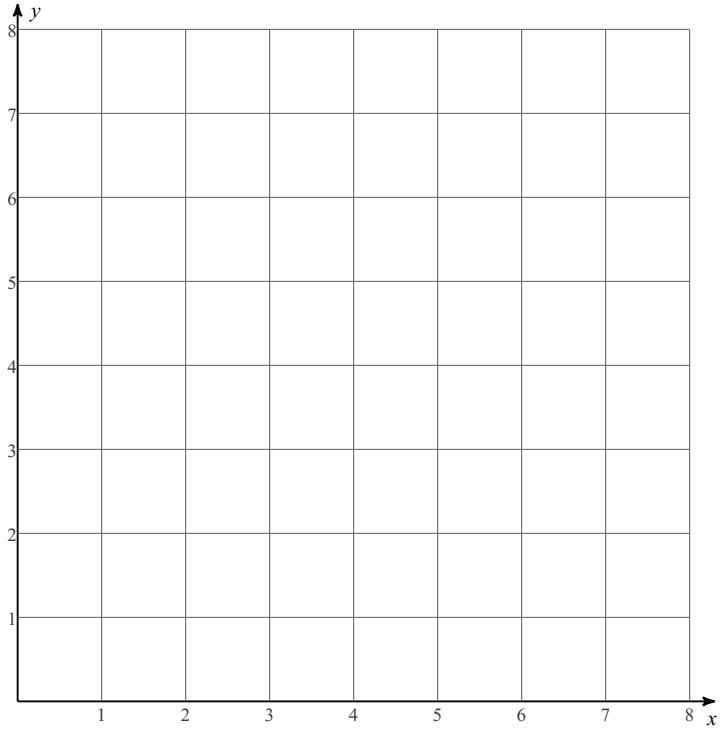
OBJECTIVE: $G = 2A + 3B$

CONSTRAINTS:

$A + B \geq 3$

$20A + 10B \leq 80$

$B \leq 2A$



11) A farming cooperative mixes two brands of cattle feed. Brand X costs \$25 per bag and contains 2 units of nutritional element A, 2 units of element B, and 2 units of element C. Brand Y costs \$20 per bag and contains 1 unit of nutritional element A, 9 units of element B, and 3 units of element C. Find the number of bags of each brand that should be mixed to produce a mixture having a minimum cost per bag. The minimum requirements of nutrients A, B, and C are 12 units, 36 units, and 24 units, respectively.

DEFINE VARIABLES

X = # of bags of brand X

Y = # of bags of brand Y

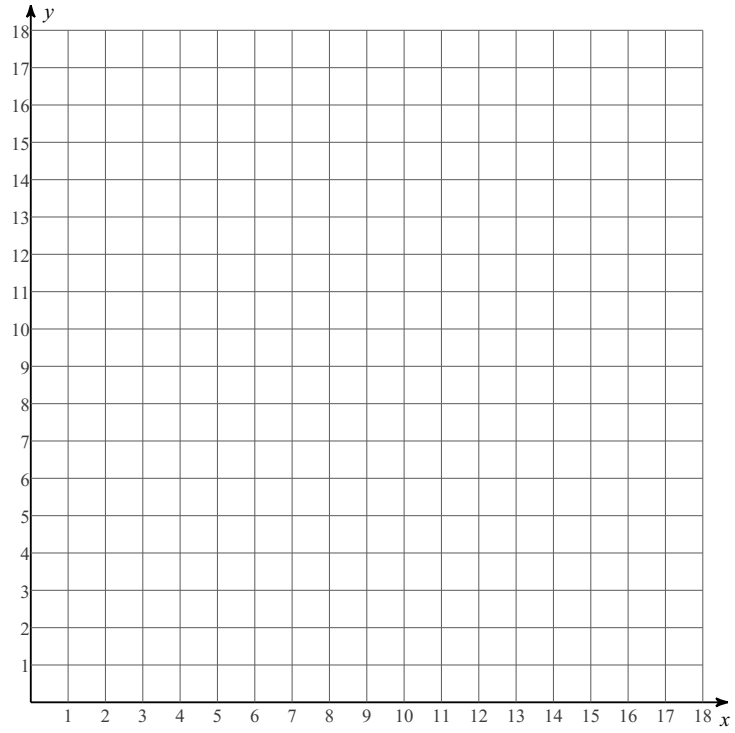
OBJECTIVE: $C = 25X + 20Y$

CONSTRAINTS

$2X + Y \geq 12$

$2X + 9Y \geq 36$

$2X + 3Y \geq 24$



The following linear programming problem is graphed for you. Continue the problem by shading the feasible region and finishing the solution.

12) A fruit grower has 150 acres of land available to raise two crops, A and B. It takes one day to trim an acre of crop A and two days to trim an acre of crop B, and there are 240 days per year available for trimming. It takes 0.3 day to pick an acre of crop A and 0.1 day to pick an acre of crop B, and there are 30 days per year available for picking. Find the number of acres of each fruit that should be planted to maximize profit, assuming that the profit is \$140 per acre for crop A and \$235 per acre for crop B.

DEFINE VARIABLES

A = # of acres of fruit A

B = # of acres of fruit B

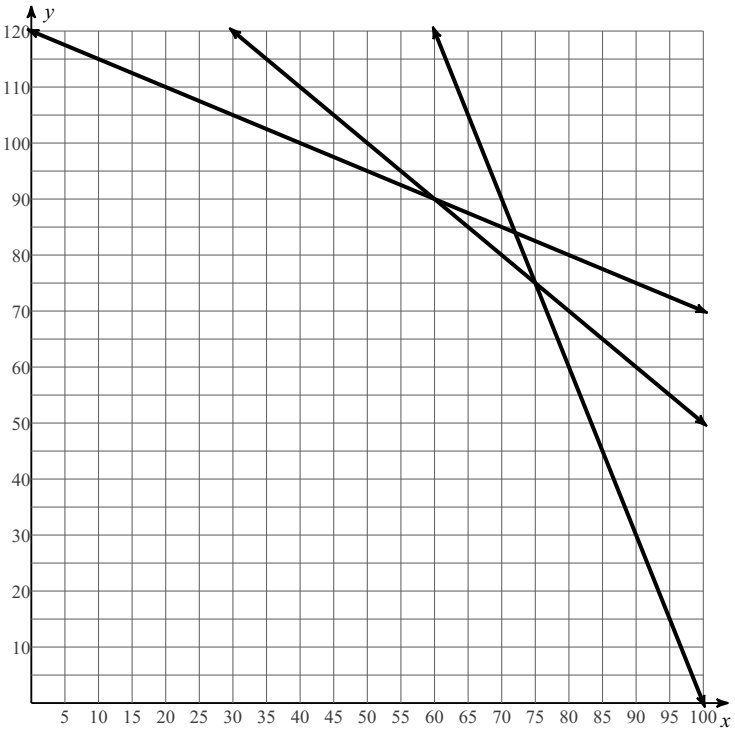
OBJECTIVE: $P = 140A + 235B$

CONSTRAINTS

$A + 2B \leq 240$

$0.3A + 0.1B \leq 30$

$A + B \leq 150$



13) A painter has exactly 32 units of yellow dye and 54 units of green dye. He plans to mix as many gallons as possible of color A and color B. Each gallon of color A requires 4 units of yellow dye and 1 unit of green dye. Each gallon of color B requires 1 unit of yellow dye and 6 units of green dye. Find the maximum number of gallons he can mix.

DEFINE VARIABLES

A = # of gallons of color A

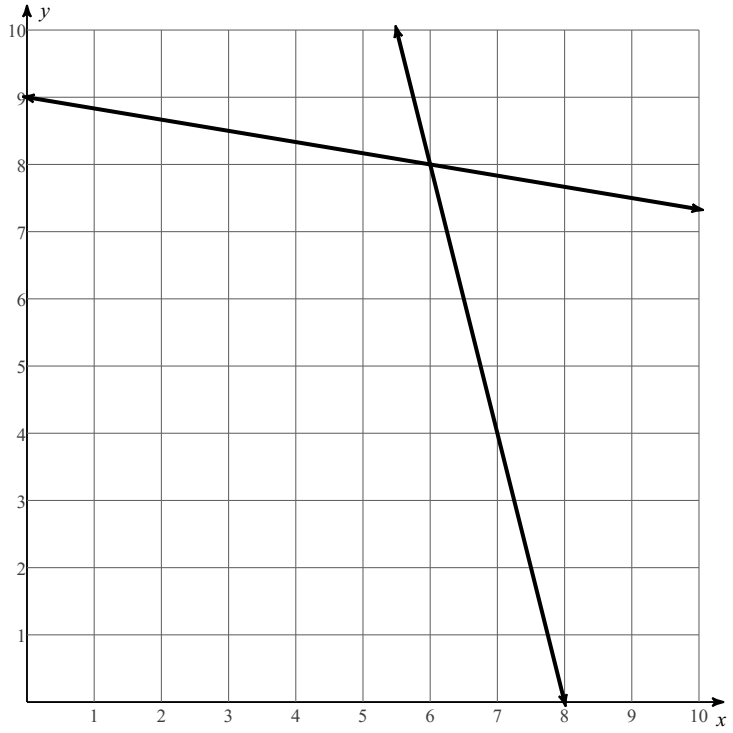
B = # of gallons of color B

OBJECTIVE: $Total = A + B$

CONSTRAINTS

$4A + B \leq 32$

$A + 6B \leq 54$



14) A farmer has a 320 acre farm on which she plants two crops: corn and soybeans. For each acre of corn planted, her expenses are $50 and for each acre of soybeans planted, her expenses are $100. Each acre of corn requires 100 bushels of storage and yields a profit of $60; each acre of soybeans requires 40 bushels of storage and yields a profit of $90. If the total amount of storage space available is 19,200 bushels and the farmer has only $20,000 on hand, how many acres of each crop should she plant in order to maximize her profit?

DEFINE VARIABLES

C = # of acres of corn planted

S = # of acres of soybeans planted

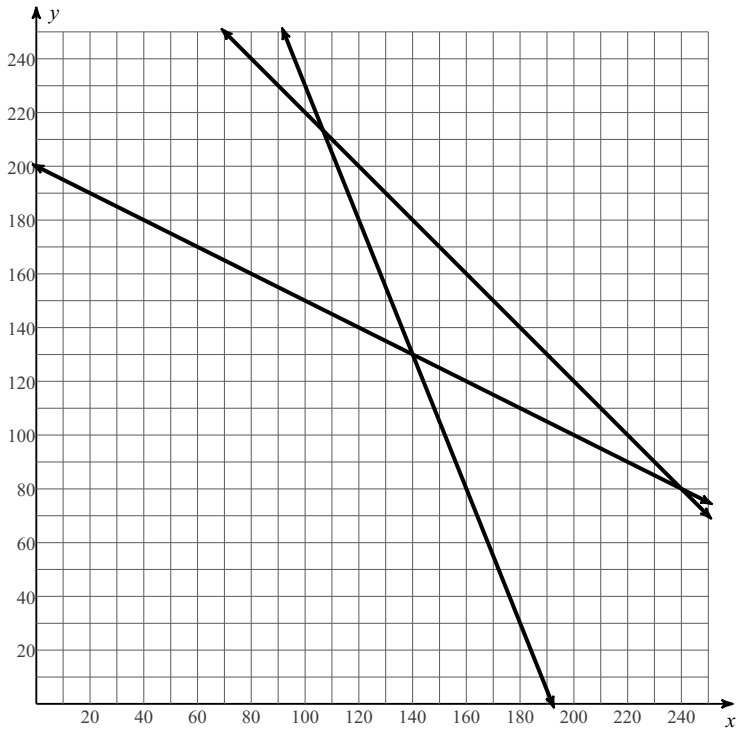
OBJECTIVE: $P = 60C + 90S$

CONSTRAINTS

$C + S \leq 320$

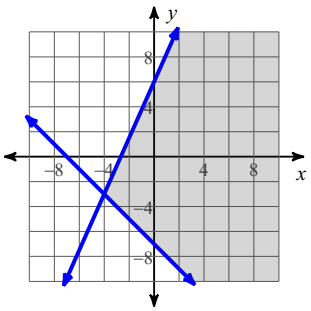
$50C + 100S \leq 20000$

$100C + 40S \leq 19200$



Answers to Target 1.3 Relearning Packet

1)



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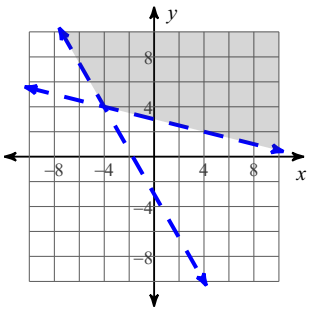

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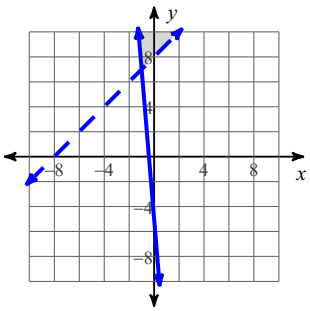

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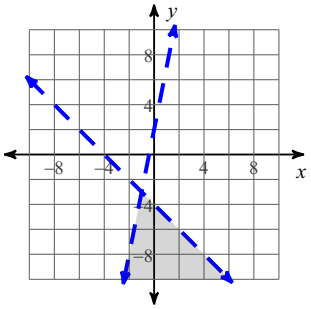

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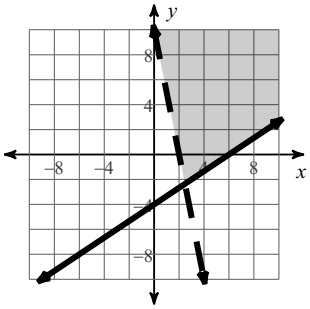

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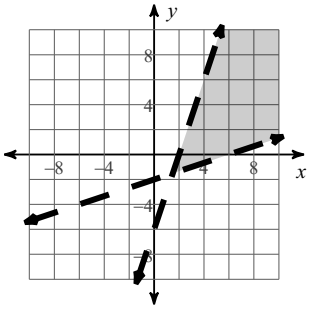

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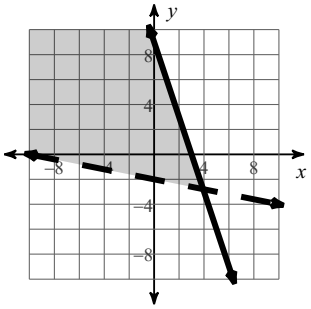

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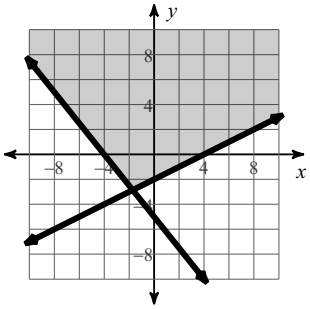

9) The maximum profit is $3,100 by planting 5 acres of wheat and 2 acres of rye.

10) The maximum amount of gold extracted is 14 ounces by processing 2 tons of ore from source A and 4 tons of ore from source B.

11) 3 bags of Brand X feed and 6 bags of Brand Y feed will yield a minimum cost of $195.

12) The farmer should plant 60 acres of crop A and 90 acres of crop B for a maximum profit of $29,550.

13) The painter should mix 6 gallons of A and 8 gallons of B for a total of 14 gallons.

14) The farmer will make a maximum of $20,100 if she plants 140 acres of corn and 130 acres of soybeans.