Algebra I Practice A.CED.A.3: Modeling Systems of Linear Inequalities 1

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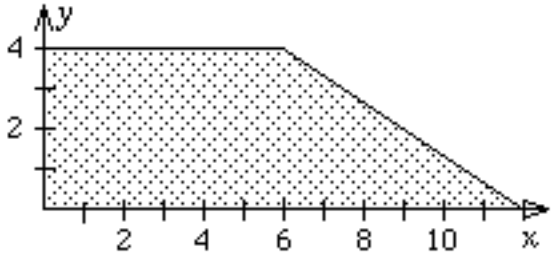
1. Write a system of inequalities that will include these three points in the solution set: $(-2, 1), (-3, 2), (-3, 0)$.

2. Write a system of linear inequalities with solutions only in quadrants I and IV.

3. Which restrictions are graphed below?



[A] $y \geq 0;\ 0 \leq x \leq 4;\ 2x + 3y \leq 24$

[B] $x \geq 0;\ 0 \leq y \leq 4;\ 2x + 3y \leq 24$

[C] $x \leq 0;\ y \leq 0;\ x + y \leq 4;\ 3x + 2y \leq 24$

[D] $x \geq 0;\ 0 \leq y \leq 4;\ 3x - 2y \leq 24$

4. A small fish market sells only tuna and salmon. A tuna costs the fish market \$1.25 per pound to buy and \$1.75 per pound to clean and package. A salmon costs the fish market \$2.25 per pound to buy and \$3.00 per pound to clean and package. The fish market makes \$1.20 per pound profit for each tuna it sells and \$1.80 per pound profit for each salmon it sells. The fish market owner can spend only \$159.50 per day to buy fish and \$217.00 per day to clean and package the fish. What is the maximum profit the fish owner can make per day and how much of each type of fish can he buy?

[A] 52 pounds of tuna; 42 pounds of salmon; \$144.00 maximum profit per day

[B] 42 pounds of tuna; 52 pounds of salmon; \$144.00 maximum profit per day

[C] 42 pounds of tuna; 52 pounds of salmon; \$138.00 maximum profit per day

[D] 52 pounds of tuna; 42 pounds of salmon; \$138.00 maximum profit per day

5. A company makes two chemicals: Type I and Type II. Due to storage problems, a maximum of 100 pounds of Type I and 150 pounds of Type II can be mixed and packaged each year. One pound of Type I takes 60 hours to mix and 70 hours to package; one pound of Type II takes 40 hours to mix and 40 hours to package. The mixing department has at most 7200 hours available each year, and packaging has at most 7800 hours available. If the profit for one pound of Type I is \$62 and for one pound of Type II is \$40, what is the maximum profit possible each year?

[A] \$7338.00 [B] \$7178.00

[C] \$7484.00 [D] \$7320.00

6. Write a set of restrictions based on the information in this table and an objective function for profit. A grocer wants to buy 100 lb of dried fruit. Let *x* represent the number of pounds of dried apricots and *y* represent the number of pounds of dried pineapple.

	Dried Apricots	Dried Pineapple
Cost	\$1.50 / lb	\$1.75 / lb
Selling Price	\$3.00 / lb	\$4.00 / lb

The cost must be no more than \$500.

7. A company makes two chemicals: Type I and Type II. Due to storage problems, a maximum of 100 pounds of Type I and 150 pounds of Type II can be mixed and packaged each year. One pound of Type I takes 62 hours to mix and 78 hours to package; one pound of Type II takes 44 hours to mix and 46 hours to package. The mixing department has at most 7220 hours available each year, and packaging has at most 8260 hours available. If the profit for one pound of Type I is \$70 and for one pound of Type II is \$46, what is the maximum profit possible each year?

8. An ice cream shop makes \$1.25 on each small cone and \$2.25 on each large cone. On a typical Saturday, it sells between 60 and 80 small cones and 120 and 150 large cones. The total sales have never exceeded 200 cones. How many of each size cone must be sold to maximize profit?

9. Becki plans to start a craft business. She also wants to take classes to learn how to do new crafts. She has no more than 40 hours a week for her business and classes. She plans to work at least 30 hours a week at her business and to spend between 2 and 6 hours attending classes. She decides that working at her business is three times as valuable as taking classes. Find the best way for Becki to split her time between her business and classes.

[1] Answers may vary. Sample: $y < -x$ and $y > x + 2$

[2] Answers may vary. Sample: $y > -x + 2$ $y < x$

[3] B

[4] D

[5] D

[6] $x \geq 0;\quad y \geq 0;\quad x + y \leq 100$; $1.5x + 1.75y \leq 500;\quad P = 1.5x + 2.25y$

[7] $7828.00

[8] 60 small cones, 140 large cones

[9] 38 hours on her business and 2 hours attending classes