Project 2: Modeling with Systems of Inequalities in Two Variables Activity Sheet

Part 1: Determining a Solution to Inequalities

Is the ordered pair (5.43,0) a solution to all, some, or none of these inequalities? Be prepared to explain your reasoning.

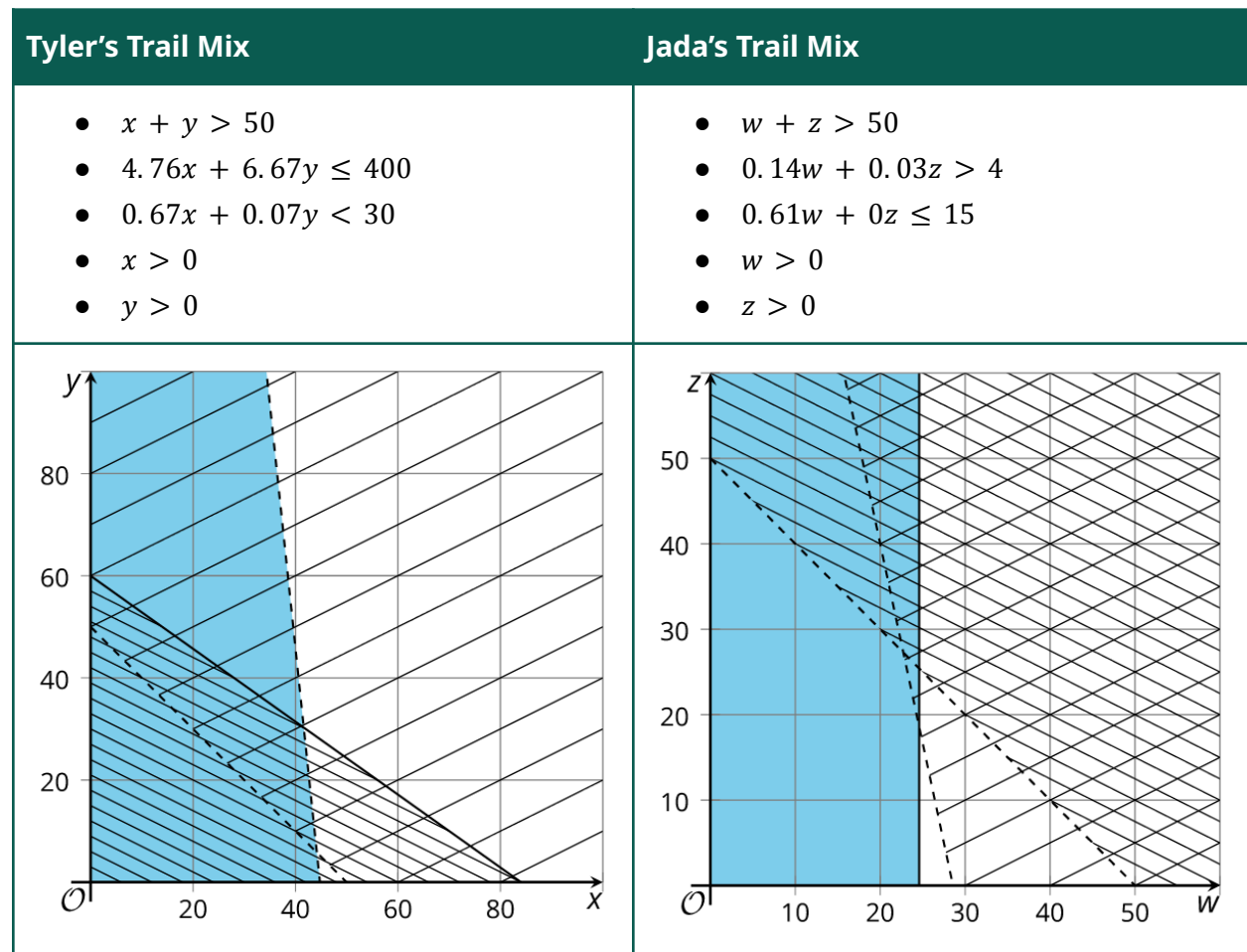$x > 0$ $y > 0$ $x \geq 0$ $y \geq 0$

Part 2: Interpret a Set of Mathematical Models

Here is the nutrition information for some trail mix ingredients:

	Calories per gram (kcal)	Protein per gram (g)	Sugar per gram (g)	Fat per Gram (g)	Fiber per Gram (g)
Peanuts	5.36	0.21	0.04	0.46	0.07
Almonds	5.71	0.18	0.21	0.46	0.07
Raisins	3.00	0.03	0.60	0.00	0.05
Chocolate pieces	4.76	0.05	0.67	0.19	0.02
Shredded Coconut	6.67	0.07	0.07	0.67	0.13
Sunflower Seeds	5.50	0.20	0.03	0.47	0.10
Dried Cherries	3.25	0.03	0.68	0.00	0.03
Walnuts	6.43	0.14	0.04	0.61	0.07

Algebra 1, brought to you by Openstax

Tyler and Jada each designed their own custom trail mix using two of these ingredients. They wrote inequalities and created graphs to represent their constraints.

Tyler's Trail Mix	Jada's Trail Mix
• $x + y > 50$ • $4.76x + 6.67y \leq 400$ • $0.67x + 0.07y < 30$ • $x > 0$ • $y > 0$	• $w + z > 50$ • $0.14w + 0.03z > 4$ • $0.61w + 0z \leq 15$ • $w > 0$ • $z > 0$

Use the inequalities and graphs to answer these questions about each student's trail mix. Be prepared to explain your reasoning.

1. Which two ingredients did they choose?

2. What do their variables represent?

3. What does each constraint mean?

4. Which graph represents which constraint?

5. Name one possible combination of ingredients for their trail mix.

Part 3: Perform Mathematical Modeling

It's time to design your own trail mix!

1. Choose two ingredients that you like to eat. (You can choose from the ingredients in the previous activity, or you can look up nutrition information for other ingredients.)

2. Think about the constraints for your trail mix. What do you want to be true about its calories, protein, sugar, fat, or fiber?

3. Write inequalities to represent your constraints. Then, graph the inequalities.
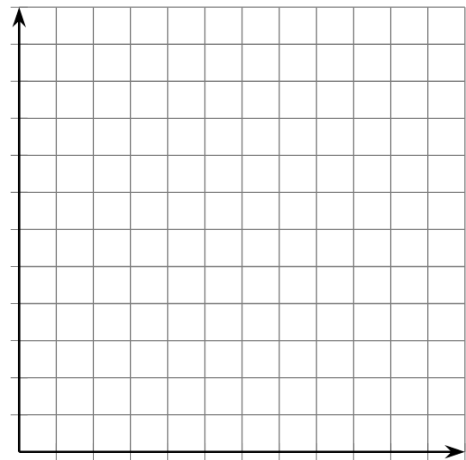
4. Is it possible to make a trail mix that meets all your constraints using your ingredients? If not, make changes to your constraints or your ingredients and record them here.

5. Write a possible combination of ingredients for your trail mix.

Pause here so your teacher can review your work and give further instructions for displaying your work.