

Math 1 Demo Lesson
Focus Areas “A” and “C”
High-Quality Questions and Student Interaction

Objective: Students will solve systems of linear equations in any form, using methods of substitution, elimination, tables, and/or graphs resulting from a mathematical context. Students will make meaning of the solution in terms of the context of the problem.

Task: Problem Based Task 3.2.2: Salary Scales

SMPs Addressed:

SMP 1: Students will predict a solution before jumping into the problem, and will come up with a plan for approaching the problem before doing any calculations. Students will explain their reasoning to a partner.

SMP 2: Students will take the problem out of context in order to solve algebraically, graphically, or in a table. Students will make meaning of their solution by putting it back in the context of the problem.

SMP 3: Students will create arguments for their approach to solving the problem and also to their solution, and will share with a partner or small group. Students will critique others’ reasoning for their approach and solution to the problem.

SMP 4: Students will model this real-world problem with appropriate mathematics for solving systems of linear equations.

SMP 5: Students will use tables, graphs, or equations as tools for solving this problem.

SMP 6: Students will communicate precisely with one another during collaboration, and will accurately label their equations, tables, and/or graphs.

Materials:

See handouts (attached). *Handout with graphic organizer included (last page).*

Lesson:

8 min Introduce the prompt (*pass out handout*):

You have recently been offered a part-time job as a salesperson at a local cell phone store. You have a choice of two different pay scales. The first option is to receive a base salary of \$300 a week plus 10% of the merchandise you sell. The second option is a base salary of \$220 a week plus 18% of the price of the merchandise you sell. The average phone sells for \$200, but accessories are also included in the merchandise sales. Which of these two options will you choose and **why**?

Instructions and questions for students:

- 1) Read the prompt out loud twice, underlining parts of the prompt that you think are important
 - 2) What is important in this prompt?
 - a. Talk to a partner about what you identified as important in this prompt. Add or subtract important aspects based on what you discuss.
 - b. We will build a whole-class list of important parts of the prompt.
 - 3) Which salary option do you predict you will choose?
 - a. Before doing any math, make a prediction as to what salary package you think you will choose.
 - i. Use the sentence frame: "I predict I will choose Option ___ because ____"
 - b. Share out your predictions and reasoning.
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30 min Student work time with guiding questions:

- 1) What is your approach to solving this problem?
 - a. Before diving into the math, come up with a plan for approaching this problem. (Think independently, then share with a partner).
- 2) Work collaboratively to answer the prompt, showing the math to justify your answer.

3) Guiding questions to ask as students work:

- a. How can you represent the two salary options algebraically?
 - i. Would it help you to show these on a graph? In a table?
- b. How can you *compare* the salary options for various amounts of sales?
- c. When does it make sense to choose the first option?
- d. When does it make sense to choose the second option?
- e. You solved the system of equations... what does your answer mean in terms of this problem?
- f. Can you justify your choice?
- g. Can you convince your partner that your choice is "the best" option?

15 min Sharing responses:

- 4) Make one final draft that clearly displays the math you used, your decision for the best salary option, and an explanation behind your decision.
- 5) Exchange your final draft with another group. Answer the questions (*see handout*):
 - a. How did the other group approach the problem? How does this compare to how your group approached the problem?
 - b. What decision did the group come to and what was their reasoning behind this decision?

- c. What are 2 questions or comments that you have for this group (be sure to frame these respectfully)?

Independent Practice/Homework

Extension question to original prompt:

Your boss has agreed to give you a third salary option. This option includes a base salary of \$160 plus 20% of the amount of the merchandise you sell. Will you take this new offer? Use mathematics and words to explain why or why not.

Your Task

You have recently been offered a part-time job as a salesperson at a local cell phone store. You have a choice of two different pay scales. The first option is to receive a base salary of \$300 a week plus 10% of the merchandise you sell. The second option is a base salary of \$220 a week plus 18% of the price of the merchandise you sell. The average phone sells for \$200, and accessories are also included in the merchandise sales. Which of these two options will you choose and **why**?

Critique the Reasoning of Another Group's Solution

1. How did the other group approach the problem? How does this compare to how your group approached the problem?

2. What decision did the group come to and what was their reasoning behind this decision?

3. What are 2 questions or comments that you have for this group (be sure to frame these respectfully)?

Independent Practice

Answer the "Extension Question" below

Original Prompt:

You have recently been offered a part-time job as a salesperson at a local cell phone store. You have a choice of two different pay scales. The first option is to receive a base salary of \$300 a week plus 10% of the merchandise you sell. The second option is a base salary of \$220 a week plus 18% of the price of the merchandise you sell. The average phone sells for \$200, and accessories are also included in the merchandise sales. Which of these two options will you choose and **why**?

Extension Question:

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Your Task

You have recently been offered a part-time job as a salesperson at a local cell phone store. You have a choice of two different pay scales. The first option is to receive a base salary of \$300 a week plus 10% of the merchandise you sell. The second option is a base salary of \$220 a week plus 18% of the price of the merchandise you sell. The average phone sells for \$200, and accessories are also included in the merchandise sales. Which of these two options will you choose and **why**?

Organize your thinking below:

<p>Option 1: Write an equation:</p>	<p>Option 2: Write an equation:</p>	
Solve (algebraically, with a graph, and/or with a table)		
Algebraically (substitution or elimination)	Graph	Table
How much merchandise will you sell in order to make the <i>same</i> amount of money from Option 1 and Option 2?		
How much money will you make?		
When would you choose Option 1?		When would you choose Option 2?
What salary option will you choose and why ?		