

Learning Project 3 Algebra/Using a Variable

Inquiry Activity 3-2: More variables

(Note: Italicized portions should be directed to students.)

1. Identifying the Problem (Item #24, PA) Calculator not allowed (Teacher directed)

Read the question carefully, as you would if taking the actual test.

24. Carpenters earn an average of \$1120 less per month than designers at a furniture factory in Smithville. The factory employs 3 designers and 15 carpenters. Let x represent the average monthly pay of a designer.

Which of the following functions correctly shows the relationship between the monthly payroll (P) and the wages of these employees?

- 1) $P = 3x + 15(x - 1120)$
- 2) $P = 3(x - 1120) + 15x$
- 3) $P = 3(x - 1120) + 15(x - 1120)$
- 4) $P = 3 + x + 15 + (x - 1120)$
- 5) $P = 3(x)(15)(x - 1120)$

**Calculator
NOT Allowed**



Here are some problem clarification questions you may want to consider when reading test questions.

What words and/or symbols might be important to understand to answer this problem and what are they telling you?

What words and/or symbols are unfamiliar and what do you think they mean?

2. Becoming Familiar with the Problem

Ask yourself questions like these about the problem, taking note of the ones that were especially helpful so that you can remember to use them when you take the test.

Re-read the question. What is it asking you to find?

What information in the problem is relevant to what you need to find? (Take notes to organize the information.)

What do you know about this?

3. Planning and Performing Tasks

Try to answer the test question any way you can, even if you have to guess, but try to be aware of the reasoning and operations that you are using. The following questions can be helpful.

What is the problem asking you to do in terms of mathematics? Bring things together, separate things, or compare things?

This situation brings things together in a monthly payroll.

Substitute an easy number for x to figure out the relationship.

Hoping that the students remember this step from the last activity, we won't give any hints this time. If a student is stumped, you might get him moving by asking what the amount of the payroll would be if a designer earned \$4000 a month.

Choose an answer. (Which equation describes the process that you used above?)

Is your answer reasonable?

Be ready to defend your answer, the way that you found it, and its reasonableness.



4. Sharing with Others

Telling other people what you know helps you to understand the material better. So take this opportunity not only to share the knowledge, but also to learn it more completely.

Small Groups: Compare your answer to others in the group, and explain why and how you found it and why you think yours is correct.

What does $(x - 1120)$ represent in the problem situation?

Since x represents a designer's pay, $(x - 1120)$ represents a carpenter's pay.

Agree on the correct answer choice and be ready to explain the step-by-step process that the equation describes. Discuss each mathematical operation in the equation and give a logical explanation for using it. If necessary, check textbooks for instruction on algebraic notation.

Since they have now discussed WHEN to multiply and add in the last 3 items, they should be ready to offer the explanation themselves.

Whole class: Report your answer choice and the process that the equation describes to the whole class. Give a reason for using each operation when you did. Show that when you use a number instead of x , you find an answer that makes sense.

5. Reflecting, Extending and Evaluating

Reflecting: Think about what you have learned. (group or instructor led.)

Here are some questions to start you thinking about the experience you just had. Thinking about what you have learned and experienced is part of the learning process. When the focus is only on the answer, you don't get much time to think about what was learned.

What do the parentheses around $(x - 1120)$ tell you to do?

Generally speaking, it tells you to consider what is inside as a single quantity. When you are evaluating this expression, the parentheses tell you to do this subtraction before you multiply.

How did the mathematical equation tell you to multiply?

When the variable, x , was next to the 3, it meant 3 times x .

When there was no sign between the 15 and the parentheses, it meant to multiply 15 by the quantity in the parentheses.

The expression, $x - 1120$, describes a number that is 1120 less than whatever x is.

Complete this table:

Designer's pay x	$x - 1120$	Carpenter's pay
3000	$3000 - 1120$	1880
3550		
4000		
4550		
5000		

Answers for instructors:

3550 input results in 2430 Carpenter's pay

4000 input results in 2880 Carpenter's pay

4550 input results in 3430 Carpenter's pay

5000 input results in 3880 Carpenter's pay

Connect the idea of 'rate' in this situation to other situations you have studied in other activities. Note the similarities and differences.

In this item, they multiplied the number of designers by the pay of one. In the previous activity they multiplied the number of people by the fee for one. Similarly, in the previous Learning Project, they multiplied the number of days by the charge for one day.

Extending: *Extend what you learned to new situations.*

In extending, you are being asked to transfer the information presented in the Practice Test question to other information or situations you already know and maybe making new connections to other information.

Small groups: *Use your calculator and the numbers in the table above to show that $(x - 1120)$ is not the same as $(1120 - x)$. For example, enter $1120 - 3000$ into your calculator and compare the answer to the one above. Repeat with the other numbers and state your conclusion.*

Make up a problem (including 5 answer choices) similar to this one that involves purchasing 3 cans of soup and 5 bottles of soda. Your problem should state that a bottle of soda costs \$2 less than a can of soup, but should not specify what the soup costs. Share your problem with the class.

Evaluating: *Assess what you learned and how you learned it.*

In this last step, you get a chance to review the content of what you learned and the methods used to learn. There are no right or wrong answers to these questions; it is your chance to look more closely at your learning style and the opportunity to state how you benefited or didn't benefit from the content and/or the methods to help you pass the GED test.

What progress have I made toward my personal math goals?

What do I need to spend more time on?

If you want it, ask your instructor to recommend some practice for you.