



Learning Project 3 Algebra/Using a Variable

Inquiry Activity 3-1: Introduction to variables

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

1. Identifying the Problem (Item #19, PA) Calculator NOT allowed (Teacher directed)

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

19. To rent a ball field for a game costs a \$300 basic fee, plus a \$2 fee per person.

If x persons attend the game, which equation can be used to find T , the total cost of renting the ball field?

$$T = 2x + 300$$

$$T = 300x + 2$$

$$T = (300 + 2)x$$

$$T = \frac{300+2}{x}$$

$$T = (300)(2x)$$

**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?

It is not asking for an answer in the traditional sense. The equation is just a step-by-step plan of what to do.

What information in the problem is relevant to what you need to find?

What do you know about this?

3. Planning, Assigning 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.

Substitute an easy number for x to figure out the relationship. (For example, if the number of people, x , were 20, what would the cost be? Remember the step-by-step process that you used to find it.)

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

Is your answer reasonable? (Check it by using $x = 20$ again)

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



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.

Agree on the correct answer choice and be ready to explain the step-by-step process that the equation describes. If necessary, check textbooks for instruction on algebraic notation (for instance, what does $2x$ mean?) and unfamiliar vocabulary (for example, equation).

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

5. Reflecting, Extending and Evaluating.

This discussion should ease the students' anxiety about algebra. Substituting an easy number for the variable as suggested above illustrates a common use of a variable, a letter used in place of a number when the number is unknown or when it can change. In the GED test, one can often figure out the answers to the algebra problems without studying formal algebra if they understand how variables are used.

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.

This item is in the no-calculator section of the test. Explain if and how using a calculator could have been helpful to you.

Ask this question to raise the students' awareness that mathematics involves more than computation. Most will probably answer that they don't think the calculator would have been helpful since there was no computation involved in choosing the answer. A few might say that they could have used it to explore the patterns of each of the equations.

In the expression, $2x + 300$, there is nothing between the 2 and the x . What does this mean in algebra? Explain how this operation between the 2 and the x makes sense in the problem situation, by connecting it to the rate activities in the last project

When there is no sign between a number and a variable or between two variables, it signifies multiplication. In this situation, \$2.00 is charged for each person, so 2 needs to be multiplied by the number of people (x).

The variable, x , is a letter that is used in place of a number that can change. When x has a value, you can figure out what the value of T is by following the steps that the equation describes. For instance, if 100 people attend the game, what is the total cost? Fill in the following table:

x	$2x + 300$	T
100	$2(100) + 300$	500
0		
50		
80		
150		

Answers for instructors: 0 input results in 300 Total
 50 input results in 400 Total
 80 input results in 460 Total
 150 input results in 600 Total



GED as Project

Pathways to Passing the GED

It seems as if the \$300 basic fee will be charged even if no one shows up for the game. In which Inquiry Activity have you talked about this idea before? Explain the connection.

In item 20 (Inquiry Activity 1-2 in Learning Project #1,) you focused on the y-intercept on the graph, the point that corresponds to the value of the output when the input is zero. If the function $T = 2x + 300$ were graphed, 300 would be the y-intercept because it is the value of T when $x = 0$.

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: *Look at the other answer choices in this item. Discuss the processes you think each of the equations is describing. Substitute 100 for x and figure out what the value of T would be in each equation. Which, if any, are reasonable amounts? Report your conclusions to the class.*

In 2) $T = 300x + 2$, the number of people is multiplied by 300 and then 2 is added. If x is 100, T would be \$30,002.

In 3) $T = (300 + 2)x$, 300 and 2 are added first and that answer is multiplied by the number of people. If x is 100, T would be \$30,200.

In 4) $T = \frac{300 + 2}{x}$, 300 and 2 are added first and then divided by the number of people. If x is 100, T is \$3.02

In 5) $T = (300)(2x)$, the number of people is multiplied by 2 and that answer is multiplied by 300. If x is 100, T is \$60,000

Let n represent a number. Write a mathematical expression for:

- a) 10 times the number
- b) 5 more than the number
- c) the number divided by 7
- d) 3 less than the number

- a) $10n$ or $n(10)$
- b) $5 + n$ or $n + 5$
- c) $n/7$
- d) $n - 3$

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.

Describe your feelings about the algebra that you learned in this activity.

Pinpoint, if you can, the particular thing that you still do not understand from this activity. Keep it in mind as you do the next activities in the project, looking for the insight that will make things clear.

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