

Learning Project 6 Fractions, Proportions and Percents

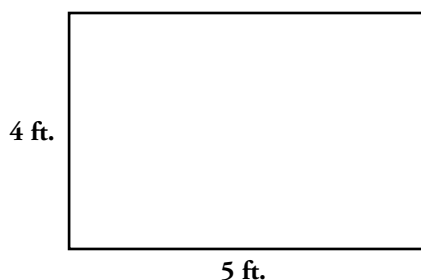
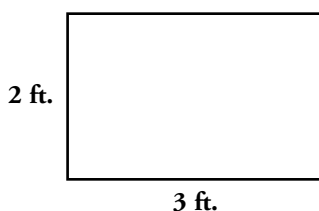
Inquiry Activity 6-3: Setting up a Proportion

(Note: The italicized portion is directed to the learners.)

1. Identifying the Problem: (Item # 25, PA) Calculator not allowed.

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

25. The public transportation system in Centra City charges \$90 for a 2-ft. by 3-ft. rectangular advertising space in its buses.



**Calculator
NOT Allowed**



If the price (x) of an ad is proportional to its AREA, which of the following expressions correctly determines the price (x) for a 4-ft. by 5-ft. advertisement?

- (1) $\frac{5}{9} = \frac{90}{x}$
- (2) $\frac{6}{20} = \frac{90}{x}$
- (3) $\frac{6}{x} = \frac{20}{90}$
- (4) $\frac{10}{18} = \frac{90}{x}$
- (5) $\frac{10}{x} = \frac{18}{90}$

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?

Cannot know what words the learner will choose. The following represents a possible, though non-exclusive, list: price proportional to area.

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

Here is a non-exclusive list of some of the words that may present problems with some learners: rectangular advertising space.

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.

Reread the question. What is the question really asking?

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

What do I know about this?



Any experience with public transportation and the advertising there might help in understanding the context but not the math. Research on Proportion formula in previous Inquiry Activities in this Learning Project helps.

The problem has two sketches. How does that help you with this problem?

Can the Mathematics Formula page found in the Official Practice Test booklet help?

What math functions do you think need to be performed here, if any? (Remember, just list them or think about them; don't do them yet!)

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 directions and questions can be helpful.

Use your experience with similar problems to make sense of this one.

What is the problem asking you to do in terms of mathematics...bringing together, separating, or comparing?

Proportion is a comparing process.

In your own words, determine what to look for in the facts of this problem.

Restate the question (or situation) using fewer words.

Eliminate unreasonable multiple-choice answers.

Find the answer.

Is the answer reasonable?

Be ready to defend your answer (whether you worked individually or with someone else) and the way 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 your knowledge but to learn it more completely.

Small groups: *Compare your answers to others in the group and explain why and how you found it and why you think it is correct.*

Agree on the correct answer and the step-by-step process used to find that answer.

Give an explanation as to why each of the other answer choices is incorrect.

Do some research in the math texts to find support for the proportion formula that your group decided was the correct answer. Don't forget to cite the text name and page number that you used.

Whole Class: *Report to the class your determinations of the steps you decided on to answer this question, the estimation process used, as well why the incorrect answer choices are wrong.*

At the completion of all the group presentations, the class should review how this problem shows how the set up of the proportion problem is the most critical factor when solving it.

5. Reflecting, Extending and Evaluating:

Reflecting: *Think about what you learned.* (Group activity or instructor lead)

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.

Give an explanation of why the following are also a correct answer to this problem:

$$\frac{20}{6} = \frac{x}{90}$$

$$\frac{6}{90} = \frac{20}{x}$$

$$\frac{90}{6} = \frac{x}{20}$$

Solve the problem, find out the value of x .

Given there are four ways to set up this proportion problem, which way do you prefer to set up the formula? Explain Support the learner's preferences.

Sum up your understanding of how to set up a proportion problem?

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.

How is this problem different from the other two Inquiry Activities related to proportion?

How is this problem the same?

Are there other Learning Projects that you have explored that are connected to this one in some way? Explain.

How similar is the math in proportions to an algebraic formula? Explain.

Can an understanding of fractions and equivalent fractions help with understanding a proportion problem? Explain.

Knowing that $\frac{4}{5}$ is equivalent to $\frac{8}{10}$ does help with a conceptual understanding of proportions and the proportions formula.

Find out about word analogies from non-math texts and determine how analogies and proportion problems are similar and how they are different.

Analogies have a kind of rigorous (logical) setup as does the formal proportion formula. It is important to set up the analogy "kitten is to cat as pup is to dog" as it is to set up a proportion problem in math.

You or you group make up at least one proportion problem similar to the one explored here (where you have to find the correct formula that expresses the problem). Pass your problems to other groups to solve and discuss as a class, including how to solve for the unknown.

What are other situations in which the concept of proportions can be used and how would you use the proportion formula in those other situations?

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

In this last step, you get a chance to review both the content of what you learned and the methods used to learn. There are no right or wrong answers to these questions, only 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.

Has an understanding of proportions helped you to understand algebra any better? Explain.

Has an understanding of proportions helped you to understand equivalent fractions any better? Explain.