Variable Dilemma

Each letter in the equations below stand for a different number (0 - 9). Look at each equation carefully. Think about the knowledge you have of how numbers work. Find the values of each letter (A - J).

G + G + G = D

J + E = J

G2 = D

B + G = D

F - B = C

I / H = A (H > A)

A x C = A

You will not want to explain every step you take in solving this problem. However, please keep track of your beginning steps and explain your reasoning. Maybe there are some more obvious mathematical ideas that you want to talk about.

Good luck!

Grade Levels 6 - 8

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Context

My textbook talks about the properties of numbers. My students could give me examples of the zero (or identity) property of addition and the one property of multiplication. I wanted to see if they could recognize these properties in a very different situation. I also want my students to be familiar and comfortable with letters replacing numbers.

What This Task Accomplishes

This task shows me whether students can take the different parts of this problem and try to relate them. Getting started may not be easy. I am looking for students that can persevere. This task lets me know what students have developed a sense of numbers.

What the Student Will Do

Some students try to solve the problem in order and realize that will not work. Then they will

read through each statement and usually will see that zero and one can be found if they recognize the addition and multiplication properties. Some students use trial and error and logic to put the first and third equations together.

Time Required for Task

45 minutes

Interdisciplinary Links

This is a problem that falls into the realm of pure mathematics. Although students can be shown how equations with variables are useful in solving problems in many real-life situations.

Teaching Tips

Some students may need to see the numbers zero - nine written out so they can choose and eliminate better.

Suggested Materials

- Paper
- Pencil

Possible Solutions

A = 2
B = 6
C = 1
D = 9
E = 0
F = 7
G = 3
H = 4
I = 8
J = 5

Benchmark Descriptors

Novice
The student does not use a workable strategy. The student related the number of the letter in the alphabet to the solution for that letter and decided J was 10, even though the problem said to use the numbers zero - nine. His/her second step found the value of F, B and C, but no reasoning was given. At this point the student does not have enough information to come to those solutions.

Apprentice
The student uses a strategy that will solve part of the problem. There is some evidence of reasoning. S/he discovers the first two letters using effective reasoning, but has little evidence of reasoning for finding the other letters.

Practitioner
The student has a broad understanding of the problem and the major concepts necessary for its solution. S/he uses a strategy that leads to a correct solution. There is an explanation of his/her reasoning for a part of the solution that uses effective mathematical terminology.

Expert
This student shows a deep understanding of the problem including the ability to identify the appropriate mathematical concepts and information necessary for its solution. S/he uses an effective strategy connecting his work with logic puzzles. There is a clear, effective explanation detailing how the problem was solved. S/he uses sophisticated mathematical language.