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Period 6

Penny Wars

Introduction

In this POW we are asked to figure out how many pennies Mrs. Robinson has after giving half of her pennies and 2 more, then half of what she has left and 2 more, then half of what she has left and 2 more, and she ends with 2 pennies. To solve this POW we had to use my skills of writing variable equations, solving variable equations, the distributive property, multiplying and dividing fractions, combining like terms, critical thinking, and group work/cooperation.

Solution

The first step in solving this problem was writing a variable equation. So to write the variable equation first we write a let statement

let x = amount of pennies at the start

then, go through what she is giving away and what she is keeping, first, she gives half away and ends up with half of the total

½x

And gives 2 more away

½x-2

Halves again

½(½x-2)

Gives away 2 more

½(½x-2)-2

Halves for the last time

½[½(½x-2)-2]

Takes 2 more away

½[½(½x-2)-2]-2

And ends with 2

½[½(½x-2)-2]-2=2

Once we had the variable equation we had to solve it, first by distributing the innermost parenthesis

½[¼x-1-2]-2=2

Then finish distributing

⅛x-½-1-2=2

Combine like terms

⅛x-3½=2

Then we used the property of equality to start to isolate the variable

⅛x=5½

And finished off the isolation

x=5½÷⅛

Now is where we used our knowledge of multiplying and dividing fractions (you can multiply the reciprocal of the divisor in a division problem, and the reciprocal of either monomial in a product to become the divisor)

x=5½•8

Now we made them improper fractions

x=11/2•8/1

Then cross simplified

x=11•4

Finally multiplied

x=44

And we wrote in the unit

44 pennies

And we had found the answer!

Extension 1

For the first extension, we just took the let statement and the fully simplified equation (⅛x-3½=2) and replaced the 2 with a four and solved from there. The steps were:

Isolate the variable by using the property of equality

⅛x=7½

Continue isolating the variable

x=7½÷⅛

Multiply with the reciprocal

x=15/2•8/1

Cross simplify

x=15•4

Multiply

x=60

Add unit

60 pennies

Extension 2

At first I thought that the answer was 44 because that is the only way to get 2 for the equation, but then a friend told me that it was 28, which I thought was bogus, until another friend brought to my attention that there did not have to be 2 left over to go in the 7th grade, so from there I was able to solve the fully simplified equation with instead of 2 being 0 (⅛x-3½=0) and got the answer of 28 for myself.

Extension 4

For this extension we took the left side of the original equation (½[½(½x-2)-2]-2=2) and turned it into an expression (½[½(½x-2)-2]-2) and changed the let statement to let y = amount of pennies to start with (½[½(½y-2)-2]-2). Then we simplified the expression,

By distributing

½[¼y-1-2]-2

And distributing again

⅛y-½-1-2

Then combining like terms

⅛y-3½

Reflection

This was a surprisingly easy POW compared to the ones we had in 6th grade, which took at least 2 days of working after school for a while, but it was still a fun process, and I enjoyed having some prompted extensions. One thing that made it easy is that we were all able to solve it in class, in contrast to the 2 days last year, one thing that made this problem fun was that there were a lot of steps that had to be

taken, so then it was more challenging than a problem that would be in a worksheet, and I really liked the extensions because they require critical thinking and an imaginative mind to get them which is fun and challenging, I did attempt the 2nd and the 3rd extensions, but I wasn't able to solve them.