Problems for the Web

P4W9: More Wrong Numbers

Curriculum Areas: Problem Solving, Number Sense, Use of a Calculator

Introduction:

P4W9 continues with the problems of P4W7. These problems were developed with the use of a calculator for checking in mind. Students should discuss their strategies and try to defend them if necessary. Working with a partner is a relatively non-threatening way of doing this.

For the Teacher:

Students may find these problems easier if they have previously tried some of the problems on P4W7, and talked about the strategies they used.

P4W9 (a): Rows and Columns

Students must keep in mind not only addends across each row, but also in each column. Using transparent bingo chips or other small markers on the numbers will help the students mark addends they want to use. This will avoid erasing.

Row three has only one possible solution: 6 + 6 + 7. Discuss this with students. Why is it a useful strategy to find a row or column for which there is a unique solution?

The two columns with unique solutions are columns three (6 + 8 + 8) and six (8 + 5 + 4). Numbers that should remain (i.e. not crossed out) are given here by row from top to bottom:

5 + 6 + 4; 8 + 5 + 8; 6 + 6 + 7; 7 + 8 + 5; 7 + 2 + 4; 3 + 8 + 4.

P4W9 (b): Number Triads

Answers by rows: 2 + 7 + 5; 6 + 8 + 5; 7 + 8 + 7; 2 + 6 + 4; 8 + 3 + 7; 4 + 3 + 5.

The second row and the fourth column are the ones with unique solutions.

P4W9 (c): Three at a Time

The "magic total" is 15. Rows 1 and 4 have unique solutions.

Answers by rows: 3 + 4 + 6; 1 + 5 + 2; 8 + 6 + 7; 8 + 9 + 5; 4 + 8 + 2; 2 + 7 + 3.

Some students may find this problem easier than the preceding ones, although others will find it harder because they like to know what the totals should be. Discuss reasons students give for identifying the problem as easier or harder.

P4W9 (d): Your Choice

The sums of the rows will be in the seventies.

P4W9 (e): A Challenge

Several variations of these puzzles are suggested for students to try composing. Smaller arrays (4 by 4, for example) will be easier for some. Calculators should be available to assist.

For the Students:

P4W9: More Wrong Answers

P4W9 (a): Rows and Columns

Each row and each column is an addition question. However, the answers given are correct only if you remove some of the addends.

Cross out exactly three numbers in each row <u>and column</u> to give the totals shown. Remember that every time you cross out a number for a row, you also cross out a number in a column. When you are finished, half the numbers should be crossed out.

$$
\begin{array}{ccccccc}
1 & + & 5 & + & 9 & + & 6 & + & 4 & + & 2 & = 15 \\
+ & & + & & + & & + & & + & & + \\
9 & + & 8 & + & 1 & + & 5 & + & 1 & + & 8 & = 21 \\
+ & & + & & + & & + & & + & & + \\
6 & + & 3 & + & 6 & + & 2 & + & 7 & + & 1 & = 19 \\
+ & & + & & + & & + & & + & & + \\
9 & + & 7 & + & 8 & + & 3 & + & 2 & + & 5 & = 20 \\
+ & & + & & + & & + & & + & & + \\
7 & + & 6 & + & 4 & + & 2 & + & 4 & + & 9 & = 13 \\
+ & & + & & + & & + & & + & & + \\
3 & + & 5 & + & 8 & + & 3 & + & 7 & + & 4 & = 15
\end{array}
$$

Hint: To start, look for a row for which there is only one possible solution.

There is one such row. There are also two columns for which there is only one possible solution.

P4W9 (b): Number Triads

Here's another one to try. This is addition, too, but the plus signs have been omitted. In this puzzle, just one row and one column have only one solution. Cross out exactly three numbers in each row and each column.

```
2   4   7   5   6   3  = 14
1   6   8   2   2   5  = 19
9   7   4   8   7   0  = 22
9   2   9   6   4   1  = 12
8   6   3   1   8   7  = 18
4   5   1   3   3   5  = 12
___ ___ ___ ___ ___ ___
```

P4W9 (c): Three at a Time

For this puzzle, cross out exactly three numbers in each row and column so the rows have the given totals and the columns all have the same total.

```
3   5   9   4   6   8   = 13
9   1   5   3   2   4   =  8
8   6   4   1   9   7   = 21
1   3   8   9   4   5   = 22
4   8   2   7   1   6   = 14
5   4   6   2   7   3   = 12
___ ___ ___ ___ ___ ___
[  ][  ][  ][  ][  ][  ]
```

How many rows did you find with one answer?

What is the value of [____] ?

Was this puzzle easier or harder than P4W9(a)? than P4W9(b)? Why?

P4W9 (d): Your Choice

Cross out as many numbers as you need, to solve this problem. You are given the sums of the columns, but not of the rows. The sum of each row will be an even number. When you have solved the problem you should notice another similarity among these even numbers

23	31	19	47	14	=	
17	29	43	12	31	=	
35	41	26	67	35	=	
6	10	53	81	15	=	
54	18	16	42	7	=	
89	70	69	59	81		

P4W9 (e): A Challenge

(i) Make up a similar problem for your classmates to try.

(ii) Try using four rows and four columns.

(iii) Try making up a problem in which each row has more than one possible answer.

Try making up a problem in which each row has only one possible answer.

Which is easier? Why?

(iv) Try making up a problem using multiplication instead of addition.