Integer Magic

4 x 4 Diabolical Square

Name: _____ Class: _____ Teacher: _____

A diabolical square is a special case of a magic square. In a magic square, you can add any row, column or diagonal and get the same sum. But in a diabolical square, there are many other ways of getting the same sum.

How many can you find?

-8	-1	4	3
5	2	-7	-2
-5	-4	7	0
6	1	-6	-3

By adding sets of four numbers, how many ways can you make a total of -2?

Integer Magic

Prediction Square

5	0	4	3
1	-4	0	-1
-2	-7	-3	-4
7	2	6	5

My prediction: When you finish this trick, the answer will be, humm, lets see, I think the answer will be +3.

Follow these instructions carefully:

- Choose any number in the grid above, any number at all. It's your choice. Put a counter on it.
- Put a second counter on any number that isn't in the same row or column as the first number. You have a choice of 9 numbers to choose from.
- Put a third counter on any number that isn't in the same row or column as either counter. Your choice.
- Put the last counter on the number that isn't in the same row or column as any other number.
- Add the numbers under the four counters.
- The answer is: (ta da) +3.

1. Try to follow the above steps, and NOT get an answer of +3.

2. Figure out how the square was constructed.

3. Make up your own tricky square, such that the answer is always _____.

Overhead Transparency

-8	-1	4	3
5	2	-7	-2
-5	-4	7	0
6	1	-6	-3

-8	-1	4	3	-8	-1	4	3
5	2	-7	-2	5	2	-7	-2
-5	-4	7	0	-5	-4	7	0
6	1	-6	-3	6	1	-6	-3
-8	-1	4	3	-8	-1	4	3
5	2	-7	-2	5	2	-7	-2
-5	-4	7	0	-5	-4	7	0
6	1	-6	-3	6	1	-6	-3

How the Prediction Square Works

+	2	-3	1	0
3	5	0	4	3
-1	1	-4	0	-1
-4	-2	-7	-3	-4
5	7	2	6	5

The Prediction Square is just an addition table, in disguise.

I wrote some numbers, fairly randomly around the outside of the square. The only criteria is that there shouldn't be an obvious pattern. Otherwise the trick isn't as impressive.

The final sum is just the sum of the 8 numbers written around the outside of the square.

Here's an example to explain why. Assume I chose 4 from the top row, 1 from the 2nd row, -7 from the 3rd row and 5 from the bottom row.

the 4 is just the sum of the 3 and 1
the 1 is just the sum of the -1 and 2
the -7 is just the sum of the -4 and -3
the 5 is just the sum of the 5 and 0.

And, when you add them all up, the final total is just the sum of the eight numbers.

Obviously, the trick can be extended to more than 4 rows, and the final total can be any number (even a fraction).