

ORDER IN THE COURT!

TI-73, TI-83

See end notes for the TI-82.

The class is divided into teams of two to four students. One game sheet is given to each team. Four different types are included; the easiest is the 2 X 2. All students write the same five-number expression in the Numerical Expression Box at the top of their paper. For example, the expression might be $8*9+5-7*5$. This expression is either decided by the teacher or else is selected randomly by the calculator. To have the calculator randomly select the expression use the randInt function located in the PRB menu under the 1 key. The first use of the randInt chooses the numbers to be used; the second use, the operations (1=add, 2=subt, 3=mult, and 4=div). The example screen shots below show how to translate the random selection into the numerical expression to be used.

```
MATH NUM LOG LOG2 LOG10
1:rand
2:randInt(
3:nPr
4:nCr
5:!
6:coin(
7:dice(
```

```
randInt(1,9,5)
(8 9 5 7 5)
randInt(1,4,4)
(3 1 2 3)
```

```
8*9+5-7*5 42
```

Next the teacher gives the students several sets of conditions to write in the boxes marked TBA. The task for the students is to obtain the largest value in the class, the smallest value and, if used, the least absolute value (closest to zero) by inserting in the expression the conditions given. The numbers and operations must always be in the same order; only insertions can occur. Set a time limit; 20 minutes is suggested. At the end of this time period, each team is to have one expression and its value written in every cell on their team response sheet.

Let's say that the first condition given was to insert one set of parenthesis and the second condition was to insert a negative sign and the squaring symbol. The screen shots below show several possibilities. Notice that the conditions cannot be mixed; i.e., in this example, one set of parenthesis AND a negative and a square cannot all be inserted in the same expression. However, if the second condition had been to insert one set of parenthesis, one negative and one square, then all three must appear in the expression.

```
8*9+(5-7)*5 62
8*(9+5)-7*5 77
(8*9+5)-7*5 42
(8*9+5-7)*5 350
8*(9+5-7*5) -168
```

First Condition

```
-8*9+52-7*5 -82
-8*9+5-72*5 -312
8*92+ -5-72*5 398
8*9+5-7* -52 252
8*92+5- -7*5 688
8*9+5- -72*5 322
82* -9+5-7*5 -606
-8*92+5-7*5 -678
```

Second Condition

If these were all the examples that the team came up with, their paper would appear as follows:

Insert the Following	Largest Value	Smallest Value
TBA A set of parenthesis	$(8*9+5-7)*5=350$	$8*(9+5-7*5)=168$
TBA a negative & a square	$8*9^2+5-7*5=688$	$-8*9^2+5-7*5=678$

A team will score a point for each cell that that has the best answer in the class provided that a randomly chosen person from the team is able to give the correct order of operations the calculator used to compute the answer. Bonus points are given if a team scored a point in every cell for a single condition (horizontal row) or for a single task (vertical row).

Here are some ideas to use for Conditions:

- Two sets of parenthesis
- Two squares (either by using the X^2 key or 2) and one set of parenthesis
- One decimal point, one set of parenthesis, and one negative
- One decimal point, one square and one set of parenthesis
- The digit 5 and the square root symbol with its closing parenthesis

This game really helps middle school students develop number sense as well as order of operations. It is important to get the students to discuss their thinking strategies. Quite often it starts off with students just randomly trying anything. But eventually most begin to really contemplate the effect of moving just one symbol. Try giving an optional bonus assignment of working on the class problem at home to try to better the class's best answers.

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2 X 2 DATA SHEET

numerical expression

TASKS

**C
O
N
D
I
T
I
O
N
S**

Insert the Following	Largest Value	Smallest Value
TBA		
TBA		

Scoring

- ❑ One point is earned for each cell that your group has the best answer in the class **only if** your randomly chosen spokesperson can explain the order of operations needed to evaluate the expression.
- ❑ A bonus point is earned for each row or column that earned a point in every cell.

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3 X 2 DATA SHEET

numerical expression

TASKS

**C
O
N
D
I
T
I
O
N
S**

Insert the Following	Largest Value	Smallest Value	Least Absolute Value
TBA			
TBA			

Scoring

- ❑ One point is earned for each cell that your group has the best answer in the class **only if** your randomly chosen spokesperson can explain the order of operations needed to evaluate the expression.
- ❑ A bonus point is earned for each row or column that earned a point in every cell.

ORDER IN THE COURT!

2 X 3 DATA SHEET

numerical expression

TASKS

**C
O
N
D
I
T
I
O
N
S**

Insert the Following	Largest Value	Smallest Value
TBA		
TBA		
TBA		

Scoring

- ❑ One point is earned for each cell that your group has the best answer in the class **only if** your randomly chosen spokesperson can explain the order of operations needed to evaluate the expression.
- ❑ A bonus point is earned for each row or column that earned a point in every cell..

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3 X 3 DATA SHEET

numerical expression

TASKS

**C
O
N
D
I
T
I
O
N
S**

Insert the Following	Largest Value	Smallest Value	Least Absolute Value
TBA			
TBA			
TBA			

Scoring

- ❑ One point is earned for each cell that your group has the best answer in the class **only if** your randomly chosen spokesperson can explain the order of operations needed to evaluate the expression.
- ❑ A bonus point is earned for each row or column that earned a point in every cell.