

# Creative



# Equations



# Creative Equations Project

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Teacher Project Directions

## Administering the Creative Equations Project:

### 1. Choose which four numbers the students will use to create their equations.

- \* Although using four fours or four nines allow many possible answers to be generated, the answers for these puzzles can be found on the internet.
- \* Some teachers like to choose the numbers of the calendar year. For instance, in 1998 some teachers used a 1, 9, 9, and 8. This will not work well in years that have several zeros.
- \* You may want to choose the four numbers yourself or allow the students to choose them.
- \* Each class should use the same four numbers. Using different numbers for different classes will encourage more individual work.

### 2. Select the number of equations that each individual or group will find.

- \* I have used the sheets for all 100 equations with motivated students.
- \* Some students may have more success becoming involved in the project if only the equations with solutions from 1-25 or 1-50 are used. Other equations might count toward extra credit. Weigh the level (and ability to persevere) of your students.
- \* The number of equation solutions selected should also be partially determined by the amount of time, in class and at home, that you want students to spend on the project.

### 3. Distribute the Creative Equations packet to your students.

- \* Each student should have a Student Project Directions sheet, one or two Creative Equations Recording Sheets, and a copy of the Creative Equations Scavenger Hunt.

### 4. Give students time to start the project in class.

- \* Students should work in groups or teams with 2 to 4 students in each group.
- \* All students in a group **must have the exact same equations** on their respective papers. This promotes cooperation, increases the mathematics done, and helps students to teach each other regarding misunderstandings in the use of Order of Operations.
- \* Calculators should be discouraged except in cases where exponents, factorial, etc. cause the numbers to be temporarily very large.

### 5. Post the Creative Equations Class Chart with Student Signature Lines sheet.

- \* I require students to check with me before posting equations and signing their names.
- \* Make it a class goal to find equations for as many of the solution numbers as possible.

### 6. Conclude the Project by Finding Scavenger Hunt Winners and Scoring Papers.

- \* Have students share their Scavenger Hunt results and reward winners for each problem.
- \* Facilitate the switching of papers and scoring of one group by another.
- \* I have the top two teams switch papers, the third and fourth teams, and so on.
- \* In a fixed amount of time, have correcting groups start with the number of successful equations reported and then deduct a point for each incorrect equation found.





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## Creative Equations Recording Sheet 1

Equation Numbers: \_\_\_\_\_

_____	= 1	_____	= 26
_____	= 2	_____	= 27
_____	= 3	_____	= 28
_____	= 4	_____	= 29
_____	= 5	_____	= 30
_____	= 6	_____	= 31
_____	= 7	_____	= 32
_____	= 8	_____	= 33
_____	= 9	_____	= 34
_____	= 10	_____	= 35
_____	= 11	_____	= 36
_____	= 12	_____	= 37
_____	= 13	_____	= 38
_____	= 14	_____	= 39
_____	= 15	_____	= 40
_____	= 16	_____	= 41
_____	= 17	_____	= 42
_____	= 18	_____	= 43
_____	= 19	_____	= 44
_____	= 20	_____	= 45
_____	= 21	_____	= 46
_____	= 22	_____	= 47
_____	= 23	_____	= 48
_____	= 24	_____	= 49
_____	= 25	_____	= 50





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Class Chart with Student Signature Lines

Equation Numbers: \_\_\_\_\_

_____	= 1	_____
_____	= 2	_____
_____	= 3	_____
_____	= 4	_____
_____	= 5	_____
_____	= 6	_____
_____	= 7	_____
_____	= 8	_____
_____	= 9	_____
_____	= 10	_____
_____	= 11	_____
_____	= 12	_____
_____	= 13	_____
_____	= 14	_____
_____	= 15	_____
_____	= 16	_____
_____	= 17	_____
_____	= 18	_____
_____	= 19	_____
_____	= 20	_____
_____	= 21	_____
_____	= 22	_____
_____	= 23	_____
_____	= 24	_____
_____	= 25	_____





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Class Chart with Student Signature Lines

Equation Numbers: \_\_\_\_\_

- \_\_\_\_\_ = 76
- \_\_\_\_\_ = 77
- \_\_\_\_\_ = 78
- \_\_\_\_\_ = 79
- \_\_\_\_\_ = 80
- \_\_\_\_\_ = 81
- \_\_\_\_\_ = 82
- \_\_\_\_\_ = 83
- \_\_\_\_\_ = 84
- \_\_\_\_\_ = 85
- \_\_\_\_\_ = 86
- \_\_\_\_\_ = 87
- \_\_\_\_\_ = 88
- \_\_\_\_\_ = 89
- \_\_\_\_\_ = 90
- \_\_\_\_\_ = 91
- \_\_\_\_\_ = 92
- \_\_\_\_\_ = 93
- \_\_\_\_\_ = 94
- \_\_\_\_\_ = 95
- \_\_\_\_\_ = 96
- \_\_\_\_\_ = 97
- \_\_\_\_\_ = 98
- \_\_\_\_\_ = 99
- \_\_\_\_\_ = 100

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# Creative Equations Project

## Teacher Tips

(1 of 2)

**Lesson Description:** Creative Equations is a group math project that requires students to create equations with a variety of solutions from four given numbers. In the process students manipulate the given numbers using many mathematical symbols. The project helps students to become fluent in the use of Order of Operations. It includes work with square roots, factorials, the proper use of parentheses in equations, and all operational symbols.

**Math Content:** Order of Operations, Equations, Square Roots, Factorials, Number Operations (Addition, Subtraction, Multiplication, and Division), Exponents, and Using Parentheses

**Time Required:** 2-3 Class Periods

### **Creative Equations Project includes:**

- \* 1 Creative Equations Teacher Project Directions Sheet
- \* 1 Creative Equations Student Project Directions Sheet
- \* 2 Creative Equations Project student worksheets
- \* 1 Creative Equations Project Four Fours sample Answer Key for Equations 1-50
- \* 4 Creative Equations Project Classroom Charts for posting equations in class.
- \* 1 Creative Equations Scavenger Hunt Sheet
- \* 2 Creative Equations Project Teacher Tips pages
- \* 1 Creative Equations Project Cover Sheet

**13 pages in all!**

**Materials Needed:** None

**Suggested Grade Level:** 5th - 8th

### **Teacher Testimonial:**

Creative Equations Project is a fun group activity that focuses on Order of Operations and manipulating numbers using many mathematical symbols. It encourages working with numbers in unique ways and allows students many “aha!” moments.

### **Teacher Tips:**

- \* Students must have a clear understanding of Order of Operations in order to complete this project successfully. This project would be a perfect follow-up to student instruction of this important math topic.
- \* Have students use only **one** equal sign at the end of the equation. In other words, if your equation is  $4 + 4 + 4 + 4 = 16$  it should not be written as  $4 + 4 = 8 + 4 = 12 + 4 = 16$ . You want one clean-looking equation for each possible answer.
- \* Four fours and four nines are numbers number puzzles that have been done before by others and there are **solutions on the internet** for these puzzles. I have included a sample answer key for the first fifty equations using four fours. Some numbers have many solutions. This page will give you an idea for the types of equations that are possible, regardless of the numbers chosen.





# Creative Equations Project

## Teacher Tips (2 of 2)

### Teacher Tips: (continued)

- \* You may want to pick another combination of numbers that students will not be able to find on the internet. Including at least one nine or one four allows for more equations to be found as you can find the square root for each number, effectively giving you one more number choice to use in your equations.
- \* Depending on the numbers selected by the teacher for this project, it may or may not be possible to write equations with solutions for every number.
- \* Some students may become confused regarding the proper order of operations if they are using a calculator. Some inexpensive calculators do not automatically perform order of operations. More complex calculators do perform equations using order of operations. Have students do the equation  $3 + 8 \times 4$  on their calculators. Type in the numbers without using an equal sign until the end. If a student gets a solution of 44 his calculator is not using order of operations. An answer of 35 clarifies that the calculator is automatically performing order of operations.
- \* I spend about 30 minutes in class the first day introducing the project and letting the students choose groups to begin working on the project. A few times before the final project due date make sure that students have the opportunity to share their equations with their group. Have students write the equations on a separate paper until it is officially approved by the group. Then spend about another 15 to 30 minutes on the due date to exchange papers (by group) and correct.
- \* As you get down to just a handful of creative equations remaining to complete the assignment, write these numbers on the board. Students will enthusiastically seek solutions for the remaining numbers. You may even want to offer prizes for the last few solution numbers.
- \* **Important:** Give students a selected amount of time per night to work on the project. Without guidelines, some students will spend hours each day trying to find the often elusive (or perhaps impossible given our rules) equation solution. I suggest about 10 minutes per day for the length of the project.

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**Mark**

