
Scientific Paper Folding

ID: 11497

Time Required
45 minutes

Activity Overview

This activity gives students an opportunity to see where large and small numbers are used and how scientific notation offers a convenient method of writing such numbers.

Topic: Numbers and Operations

- *Understand numbers, ways of representing numbers, relationships among numbers, and number systems*
 - *Develop an understanding of large numbers and recognize and appropriately use exponential, scientific, and calculator notation*
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Teacher Preparation and Notes

- *TI-Navigator is not required for this activity, but an extension is given for those teachers that would like to use it.*
- ***To download the student worksheet and navigator files, go to education.ti.com/exchange and enter “11497” in the quick search box.***

Associated Materials

- *MGAct06_Scientific_worksheet_TI73.doc*
- *MGAct06_Scientific_LrnChk.edc*
- *L_1_.73I (list L1)*

Suggested Related Activities

To download any activity listed, go to education.ti.com/exchange and enter the number in the quick search box.

- *The Large and Small Number Game (TI-73 Explorer with TI-Navigator) — 6673*
- *Light Years Away (TI-30xa, TI-30xIIB, TI-30X IIS, TI-34 II Explorer Plus) — 5253*
- *So Many Zeros (TI-30XS MultiView) — 8351*

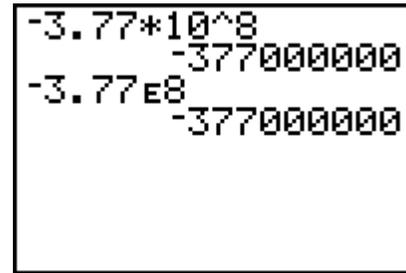
Problem 1 – Writing Scientific Notation in Expanded Form

Help students understand the form for scientific notation.

To check -3.77×10^8 , enter their answers and see if it matches the original.

Students can enter scientific notation numbers two different ways, using 10 or E.

1. (-) 3 . 7 7 × 1 0 ^ 8
2. (-) 3 . 7 7 2nd ^ 8



Problem 2 – Writing Numbers in Scientific Notation

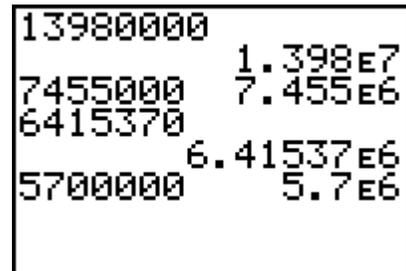
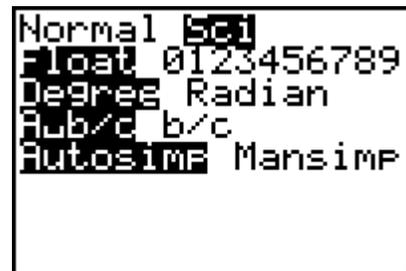
Questions 5 & 6

Students can change the TI-73 mode to “Sci” to convert numbers to scientific notation. To change the mode, press [MODE] and ▸ to move to **Sci**, then press [ENTER].

The answer will appear with an E. Explain to students that this represents $\times 10$ and the number that follows the E is the exponent.

Students should not enter the commas into the calculator when converting the salaries.

Discuss with students how to compare numbers with the exponent. What is different between Carson’s salary and Stacy’s?



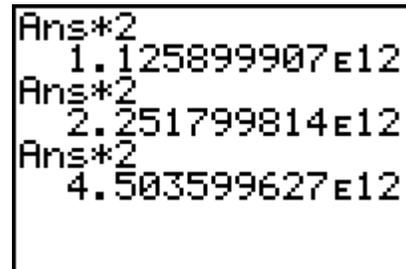
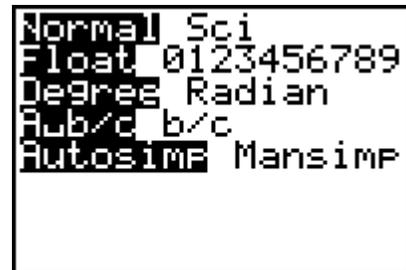
Questions 7 & 8

Students need to change the calculator mode to **Normal** by pressing [MODE] [ENTER] 2nd [MODE].

Students can fold a piece of paper in half to understand how the thickness doubles. Ensure students understand that the $\times 2$ represents the doubled thickness.

The key presses for the screen to the right are 0 . 0 [0] 4 [ENTER] × 2 [ENTER] [ENTER] [ENTER]. Continue pressing [ENTER] to solve the problem. They will need to count how many times they press enter.

They do not count the first entry as a paper fold.



Extension – TI-Navigator™

1. Open the LearningCheck™ file **MCAct06_Scientific_Nav_TI-73.edc** on the computer. Drag the window divider so the questions in the right column cannot be seen by the students. Highlight the first question and click File, Send, Item as Quick Poll. This will reveal the LearningCheck™ question in the Poll Prompt window of Quick Poll.

Tell students to read the question, agree on an answer, and submit the answer as quickly as possible. When all answers have been received, click Poll Details and Show Student Names. Use the Time Stamp feature to decide which team submitted the correct answer first and award that group 1 point. Repeat this procedure for each question and tally points at the end to determine a winning group.

2. For Questions 7 and 8, use **Quick Poll** or **Screen Capture** to gather student guesses of what the answers may be.

3. Send L1 to students and have them place the numbers in order from least to greatest. The list is a categorical list so the calculator treats the numbers as text. Make sure students understand that some of the numbers may be converted between scientific notation and expanded form.

L1	c	L2	L3	1
3744		-----	-----	
-5.2E3				
4.8E-1				
.0541				
8.6E7				

L1(1)=2 E -6				

To create additional lists or change L1, use "" around the first element. This will ensure the numbers are treated as text. The quotation can be found by pressing

2nd **MATH**. Use the arrows to move over " and press **ENTER**.

4. Use **Screen Capture** regularly to assess student progress and understanding.

Solutions to Student Worksheet

Problem 1

1. -377,000,000
2. 0.000004224
3. 120,200
4. -0.00000000000524

Problem 2

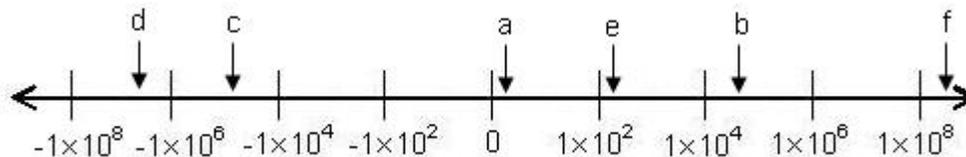
5.

Player	Salary	Scientific Notation
Carson Palmer	\$13,980,000	1.398×10^7
Stacy Andrews	\$7,455,000	7.455×10^6
Chad Johnson	\$6,415,370	6.41537×10^6
Antwan Odom	\$5,700,000	5.7×10^6
Levi Jones	\$5,266,666	5.266666×10^6

6. Students should notice that the exponents have a difference of 2. The football salaries are more than 100 times the median income.

7. 4.504×10^{10}
8. 45,040,000,000,000
9. 9.095×10^{-13}
10. 0.0000000000009095

Problem 3



11.

12. All the numbers are between -1 and 1. The larger the negative exponent, the closer the number is to zero. A possible number line is given.

