

Comparing and Ordering Numbers

ID: 11191

Time required
45 minutes

Activity Overview

In this activity, students will explore numbers and number representations for fractions, decimals, and percents. They will use a number line to compare and order numbers.

Topic: Numbers and Operations

- *Understanding numbers, representing numbers, and understanding relationships among numbers*
- *Comparing and ordering fractions, decimals, and percents*
- *Using a number line to compare and order numbers*

Teacher Preparation and Notes

- *Before beginning the activity, students should clear all lists and turn off functions. To clear the lists, press **2nd** **0** and scroll down until the arrow is in front of **ClrAllLists**. Press **ENTER** twice. To clear any functions, press **Y=** and then press **CLEAR** when the cursor is next to Y1 through Y4.*
- *Students should have prior experience with converting decimals, fractions, and percents.*
- *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, calculator files, and TI-Navigator files, go to education.ti.com/exchange and enter "11191" in the quick search box.***

Associated Materials

- *L1.73I (list for Problem 1)*
- *MGAct01_OrderNumbers_worksheet_TI-73.pdf*
- *MGAct01_Fraction_Nav_TI-73.act*
- *MGAct01_Decimal_Nav_TI-73.act*

Suggested Related Activities

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

- *Comparing and Ordering (TI-73 Explorer) — 6670*
- *Comparing Decimals (TI-73 Explorer) — 4210*

Problem 1 – Ordering Fractions and Decimals

Send **L1** to students, or use the overhead calculator to show the list to the students.

Question 1

Assign each student one of the numbers in the list. They should write this on a piece of paper or give them a sticky note with the number on it.

Have the students come to the front of the class and order themselves from least to greatest. After all students feel the list is in order from least to greatest, use the **SortA**(command on the Home screen to sort the list in ascending order.

The key presses on the Home screen are **[2nd] [LIST] [▶] [ENTER] [2nd] [LIST] [ENTER] [◀] [ENTER]**. Then, look at the list again, **[LIST]**, and the list will be in ascending order.

L1	L2	L3	1
2/3	-----	-----	
.6			
.75			
3/4			
.245			
.25			
1/3			

L1 = {2/3, .6, .75, ...

SortA(L1)	Done
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Question 2

Students may just look at the fractions and decimals and convert each to see if there is an equivalent.

To use the technology, students could convert **L1** from fractions (or decimals) to decimals (or fractions) and then store in **L2** in order to compare.

Key presses on the Home screen to convert the list and store it again are, **[2nd] [LIST] [ENTER] [F↔D] [STO▶] [2nd] [LIST] [▼] [ENTER] [ENTER]**. To see **L2** beside **L1**, press **[LIST]**.

Here students can see that 0.75 and $\frac{3}{4}$ are equivalent.

L1 → F↔D → L2
{49/200 1/4 .33...

L1	L2	L3	2
.245	49/200	-----	
.25	1/4		
1/3	.33333		
.6	3/5		
2/3	.66667		
3/4	.75		
.75	3/4		

L2(1) = 49/200

Problem 2 – Fraction Challenge

Allow students to challenge each other to find fractions between two given decimals.

Arrange students in pairs. One partner will pick two decimals. The other partner will then write a fraction that is between the two decimals.

Do this for 2 (or more) sets of decimals and fractions. Then have the partners switch roles. Repeat for 2 more sets of numbers.

After at least 4 sets of numbers have been generated, students enter them into a list, such as **L1**, in order from least to greatest.

Note: If students want to clear existing lists, press **2nd** **LIST** **6** **ENTER**.

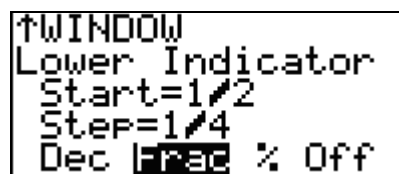
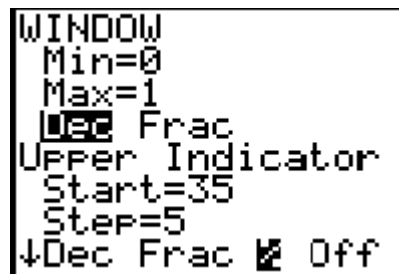
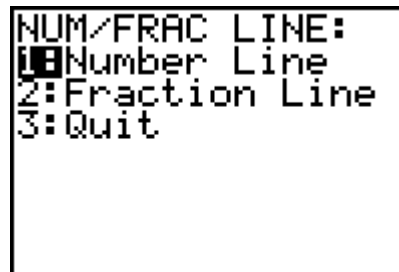


Problem 3 – Number Line App

For this part of the activity, the screenshots on the worksheet do not need to be replicated. However, if you wish to give more examples, or to let the students explore on their own, here are the key presses for starting the **Number Line App** and changing the settings.

First, make sure you have the Number Line App installed. Press **APPS** and scroll down to **NUMLINE** and press **ENTER**. Press any key to make the opening screen disappear.

Choose **Fraction Line**. Press **WINDOW** to and make changes as needed. Window refers to the area you see left to right on the fraction line. *Upper Indicator* refers to the top side of the fraction line. Pressing the down arrow will move to the *Lower Indicator* which refers to the bottom side of the fraction line. Press **GRAPH** to return to the fraction line.

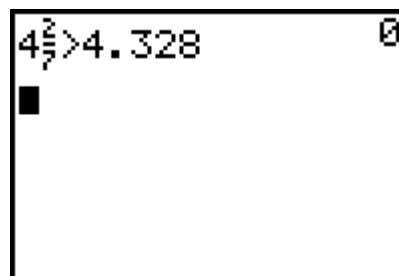


Problem 4 – Solve a Similarity Problem

Students can solve these true/false statements in other ways as well. This method is showing them the Boolean tests that will likely prove useful in future mathematics studies. The **<** and **>** symbols can be entered using the **Text** menu.

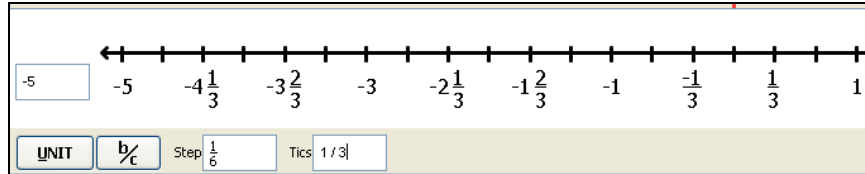
Key presses for Exercise 10 are enter the first number **4** **UNIT** **2** **b/c** **7** **2nd** **MATH**. Then scroll to **>**, **ENTER**, scroll to **Done**, **ENTER**. Enter the second number **4** **.** **3** **2** **8** and press **ENTER**.

Note: The calculator returns either 0 or 1 for Boolean test, true or false. True = 1 and False = 0.



Extension – TI-Navigator™

1. Have each student enter a list of 6 numbers into L1 that the class will then order. You may want to assign different rows (or individual students) a minimum and maximum, between -4 and 0 for example. Once students have entered their lists, use the **Screen Capture** feature of TI-Navigator to pull one student’s screen at a time (not the whole class). Have a volunteer put the numbers in order from least to greatest or greatest to least.
2. Load the **Activity Center settings** for either decimal or fraction. See *MGAct01_Fraction_Nav_TI-73.act* (or *MGAct01_Decimal_Nav_TI-73.act*)



You can adjust the **Configuration** as desired as well as the **Step** and Tic marks (**Tics**). If you change the step or tic marks to decimals, the number line will change to show decimals.

3. To use data from the students, you can ask them to convert their birthday (month and day) into a fraction, $\frac{\text{day}}{\text{month}}$. Then, display a number line using TI-Navigator and have the students place their birthday on the number line. Have students give you the best maximum, minimum, and step for them to place these fractions on the number line. ($\frac{31}{1}$, Jan 31, could be the maximum and $\frac{1}{12}$, Dec 1, could be the minimum)
4. Use **Quick Poll** to ensure students understanding. The prompt can be “Which is greater?” and then give students multiple pairs of number.

$\left(\frac{1}{3}\right)$ or $\frac{1}{4}$

(75%) or $\frac{1}{4}$

$\left(\frac{7}{8}\right)$ or .80

$-1\frac{2}{3}$ or (-1.40)

Solutions to Student Worksheet

Problem 1

1. 0.75 or $\frac{3}{4}$; 0.245

2. 0.75 or $\frac{3}{4}$

Problem 2

3. Answers will vary. Check students' work.

4. Answers will vary. Check students' work.

5. Answers will vary. Check students' work.

Problem 3

6. Answers will vary. Fraction should be between -1 and -0.6 .

7. Answers will vary. Decimal should be between $\frac{5}{6}$ and $1\frac{1}{3}$.

8. Answers will vary. Fractions should be between $-\frac{1}{4}$ and $\frac{1}{4}$.

9. Answers will vary. Decimal should be between 35% and $\frac{1}{2}$.

Problem 4

10. False

11. False

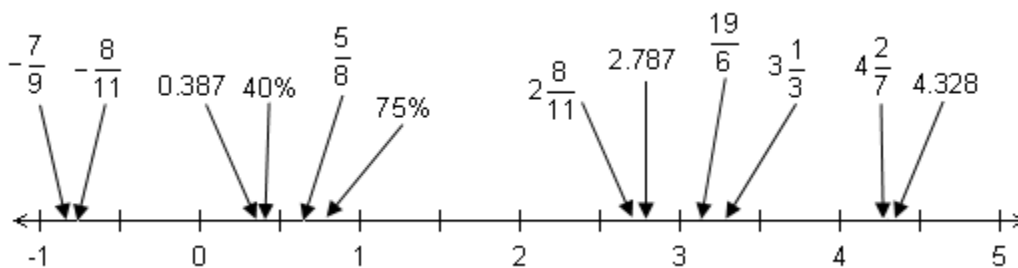
12. True

13. False

14. True

15. True

16.





Problem 1 – Order Fractions and Decimals

Answer the following questions about the numbers in list **L1**.

1. Press **LIST** after your teacher has sent list **L1**.

Which is the greatest element in the list? _____

Which is the least element in the list? _____

2. Are any of the numbers in the list equal? How do you know?

Write the answer. _____

Problem 2 – Fraction Challenge

You and your partner will take turns creating lists of decimals. The goal is to find a fraction between each pair of decimals.

3. Write the pairs decimals your partner creates. Find a fraction *between* the decimals.

1st pair

2nd pair

Decimals: _____

Decimals: _____

Fraction: _____

Fraction: _____

4. Write the pairs decimals for your partner and the fraction chosen he or she chooses.

1st pair

2nd pair

Decimals: _____

Decimals: _____

Fraction: _____

Fraction: _____

5. Enter the 4 sets of decimals and fractions into list **L2** from least to greatest.

Press **LIST** **▶** to **L2**. Enter each number, pressing **ENTER** after each. You can use **UNIT** and **b/c** to enter fractions in a list.

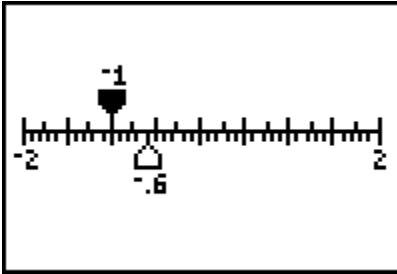
Write the new *ordered* list. _____



Problem 3 – Number Line App

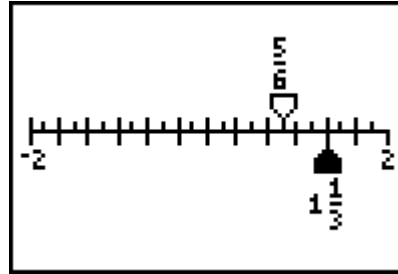
Use the screenshots provided to answer Exercises 6 – 9.

6. Find a fraction between the two given numbers.



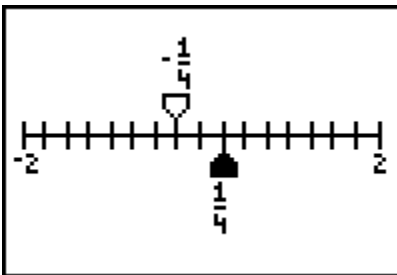
Write the answer. _____

7. Find a decimal between the two given numbers.



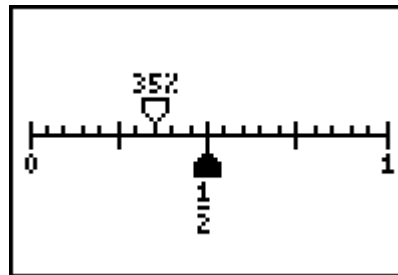
Write the answer. _____

8. Find one positive and one negative fraction between the given numbers.



Write the answer. _____

9. Find a decimal between the two given numbers.



Write the answer. _____

Problem 4 – True or False?

Use $<$ or $>$ on the TI-73 to confirm each statement. Circle True or False.

10. $4\frac{2}{7} > 4.328$

True False

11. $2.787 < 2\frac{8}{11}$

True False

12. $\frac{19}{6} < 3\frac{1}{3}$

True False

13. $75\% < \frac{5}{8}$

True False

14. $0.387 < 40\%$

True False

15. $-\frac{7}{9} < -\frac{8}{11}$

True False

16. Draw a number line and place the 12 numbers from Exercises 10 – 15 on it.