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## Number Representations

ID: 11098

Time required  
45 minutes

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### Activity Overview

*In this activity, students will explore the relationship between fractions, decimals, and percents. They will learn to use the calculator to convert between the different representations and then order them from least to greatest on a number line. Students will also work with tables and circle graphs.*

### Topic: Numbers and Operations

- *Converting between representations*
  - *Comparing and ordering fractions, decimals, and percents*
  - *Creating circle graphs*
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### Teacher Preparation and Notes

- *Before beginning the activity, students should clear all lists and turn off functions. To clear the lists, press **2nd** **PRGM** 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.*
- *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](http://education.ti.com/exchange) and enter "11098" in the quick search box.***

### Associated Materials

- *MG\_Act01\_NumberRep\_worksheet\_TI-73.doc*
- *MGAct01\_NumberRep\_LearnChk\_TI-73.edc*
- *MGAct01\_NumberRep\_Nav\_TI-73.act*

### Suggested Related Activities

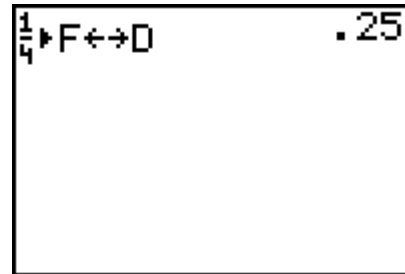
- *Fractions, Decimals, Percents — 6668*
- *Visual Fractions Activity — 8336*
- *Getting Started with Rational Number Rampage App — 6294*

**Problem 1 – Converting fractions, decimals, and percents**

Questions 1

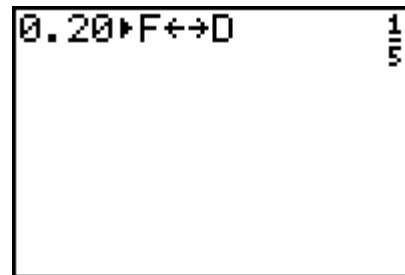
Students will first convert a fraction to its equivalent decimal using the  $\frac{\square}{\square}$  key. To do this, they need to follow the directions on the worksheet, entering the numerator, the fraction key, the denominator, then conversion key. In the example to the right the key press is,  $\boxed{1} \boxed{\frac{\square}{\square}} \boxed{4} \boxed{\frac{\square}{\square}} \boxed{\text{ENTER}}$ .

If students press ,  $\boxed{1} \boxed{\div} \boxed{4} \boxed{\text{ENTER}}$ ., they will get the same answer.



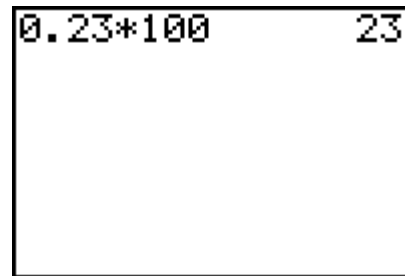
Question 2

A decimal is converted to its equivalent fraction using the same conversion  $\frac{\square}{\square}$  key. Students are to enter the decimal, with or without the leading zero, into the calculator and then press they conversion key. In the example to the right, the key press is,  $\boxed{0} \boxed{\cdot} \boxed{2} \boxed{0} \boxed{\frac{\square}{\square}} \boxed{\text{ENTER}}$ .



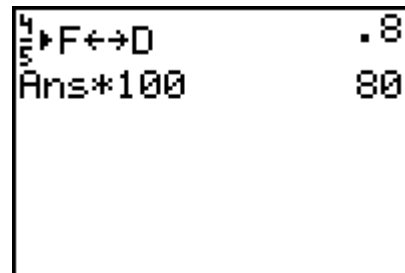
Question 3

Students can convert a decimal to a percent by multiplying the decimal by 100. They need to enter the decimal into the calculator, with or without the leading zero, multiply by 100 and then press enter. The screenshot to the right shows how 0.23 is converted to 23%. The key press is  $\boxed{0} \boxed{\cdot} \boxed{2} \boxed{3} \boxed{\times} \boxed{1} \boxed{0} \boxed{0} \boxed{\text{ENTER}}$ .



Discuss with students about how they can convert a fraction to a percent. They will need to combine two of the steps used in this first Problem, converting first to a decimal and then multiplying the decimal by 100.

An example is shown at the right using  $\frac{4}{5}$ . The key press is  $\boxed{4} \boxed{\frac{\square}{\square}} \boxed{5} \boxed{\frac{\square}{\square}} \boxed{\text{ENTER}} \boxed{\times} \boxed{1} \boxed{0} \boxed{0} \boxed{\text{ENTER}}$ .

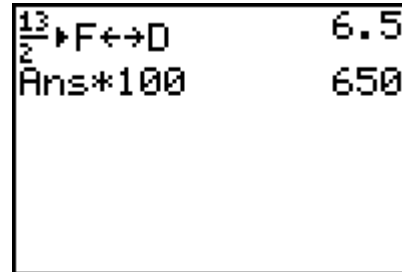
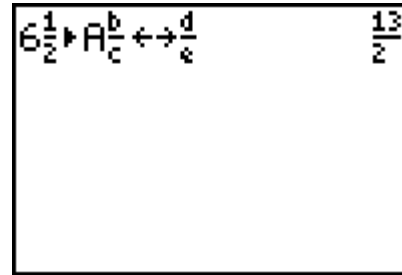


Question 4

Students explore the relationship between mixed numbers, decimals, and percents. They can enter a mixed number such as  $6\frac{1}{2}$  into the calculator by typing in the whole number, pressing **[UNIT]**, typing the numerator, arrow down to the bottom, and typing the denominator.

A mixed number can be changed to an improper fraction using the **[A<sup>b</sup>/<sub>c</sub> ↔ d]** key. For the example in the upper right, the key press is **[6] [UNIT] [1] [↓] [2] [A<sup>b</sup>/<sub>c</sub> ↔ d] [ENTER]**.

Then they can use the **[F ↔ D]** key to convert the fraction to a decimal, and multiply the decimal by 100 to convert the decimal to a percent.

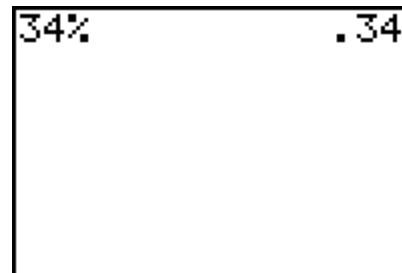


**Problem 2 – Using relationships between fractions, decimals, and percents**

Students are to use what they've learned in the previous Problem to convert all three numbers to the same form, a decimal.

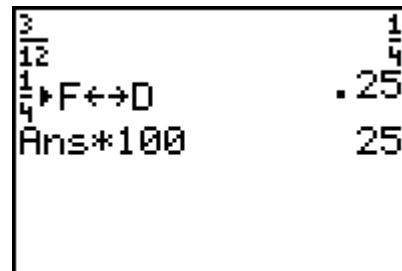
The percent can be changed to a decimal using the **[%]** key. Note: This key will only change a number that is already a percent into a decimal. For the example to the right, the key press is **[3] [4] [%] [ENTER]**.

The calculator can be used to change a percent to a decimal. For example, convert 34% to a decimal in the calculator by pressing **[3][4]**, and then **[%]**. Press **[ENTER]**.



**Problem 3 – Write a number as a fraction, decimal, or percent**

Students explore the relationship between fractions, decimals, and percents by collecting data from a pictorial model of rectangles with different shading. They are to complete a chart expressing the parts of the model as fractions, decimals, and percents.

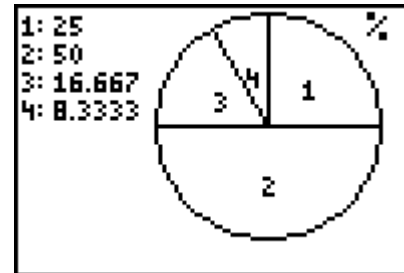


**Problem 4 – Use data to make a circle graph**

The data collected in the table can now be displayed in a circle graph. To do this, students will need to enter two lists into the calculator, one for the categories and one for the data. Directions are given on the worksheet, explaining how to enter lists **L1** and **L2**. For list L2, students should use the  $\frac{\square}{\square}$  key to enter the fractions.

L1	c	L2	L3	3
WHITE		1/4	██████	
LGREY		1/2		
DGREY		1/6		
BLACK		1/12		
-----		-----		
L3(1) =				

Then students will set up **Plot1** for the necessary circle graph settings. An example of a circle graph with data expressed as percents is shown in the screenshot.



**Extension – TI-Navigator™**

1. Load the *MGAct01\_NumberRep\_Nav\_TI-73.act* activity settings file. Assign each student a fraction, decimal, or percent between 0 and 10. Start the activity. Have each student mark their assigned value on the number line. The settings are such that each student can mark one point and that they are allowed to resubmit their points.

Once all students have completed the activity, you can have a discussion about individual points. Ask the class if any points need to be moved. If any of the assigned numbers are at the same location on the number line, ask students what this means.

2. Using *Quick Poll*, have students respond to the following question. “What is your favorite season of the year?” Make sure that all students enter spring, summer, winter, or fall.

Have students create a circle graph of the data and then using Screen Capture assess how well students.

Discuss with students what percentage prefers each season. Have them compare the percent of the circle graph with the fraction of the class.

3. Put students into pairs. Have each pair think of a decimal, percent, or fraction that they will challenge to the class. Look at their challenge number using screen capture. Have the other pairs of students in the classroom convert the given challenge to the other two representations of the number.

Let the students that presented the challenge number confirm is the rest of the class has converted the numbers correctly. (using Screen Capture of the classroom)

4. Send the *MGAct01\_NumberRep\_LearnChk\_TI-73.edc* file to the students. Have students complete the assessment and then retrieve the results. Use the Slideshow feature to discuss the results as a class. If you do not have time to complete the LearningCheck file in class, use it as a class warm up on the following day to assess student understanding.

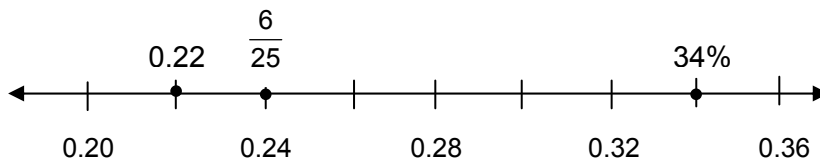
**Solutions to Student Worksheet**

Problem 1

1. .25
2.  $\frac{1}{5}$
3. 23%
4.  $\frac{13}{2}$ , 6.5, 650%

Problem 2

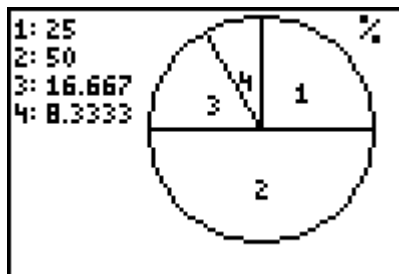
5. .34
6. .24
7. 0.22,  $\frac{6}{25}$ , 34%
- 8.



Problem 3

Color	Number	Fraction	Decimal	Percent
yellow	3	$\frac{1}{4}$	.24	24%
red	6	$\frac{1}{2}$	.5	50%
green	2	$\frac{1}{6}$	$.\overline{16}$	16.7%
blue	1	$\frac{1}{12}$	$.\overline{083}$	8.3%

Problem 4



**Problem 1 – Converting fractions, decimals, and percents**

1. Enter  $\frac{1}{4}$  into your calculator. Type the numerator,  $\boxed{1}$  first, press  $\boxed{\frac{b}{c}}$ , and type the denominator  $\boxed{4}$ .

To write  $\frac{1}{4}$  as a decimal, press  $\boxed{F \leftrightarrow D}$  and then  $\boxed{\text{ENTER}}$ .

Write the decimal. \_\_\_\_\_

2. Enter 0.20 into your calculator.

To write 0.20 as a fraction, press  $\boxed{F \leftrightarrow D}$  and then  $\boxed{\text{ENTER}}$ .

Write the fraction. \_\_\_\_\_

3. Enter 0.23 into your calculator.

To write 0.23 as a percent, press  $\boxed{\times} \boxed{1} \boxed{0} \boxed{0}$  and then  $\boxed{\text{ENTER}}$ .

Note that the symbol for percent is %.

Write the percent. \_\_\_\_\_

A **mixed number** has a whole number part and a fraction part. It can be written as an **improper fraction**, whose numerator is greater than or equal to the denominator.

4. Enter  $6\frac{1}{2}$  into your calculator. Type the whole number  $\boxed{6}$ , and then press  $\boxed{\text{UNIT}}$ . Type the numerator of the fraction part  $\boxed{1}$ , press  $\boxed{\frac{b}{c}}$ , and enter the denominator of the fraction part  $\boxed{2}$ .

To write  $6\frac{1}{2}$  as an improper fraction, press  $\boxed{A \frac{b}{c} \leftrightarrow \frac{a}{b}}$ , and then  $\boxed{\text{ENTER}}$ .

Write  $6\frac{1}{2}$  as an improper fraction. \_\_\_\_\_

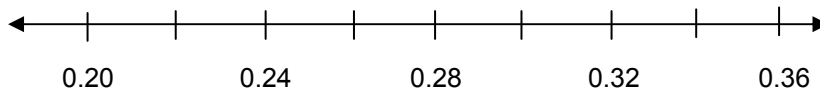
Write the improper fraction as a decimal. \_\_\_\_\_

Write the decimal as a percent. \_\_\_\_\_

**Problem 2 – Using relationships between fractions, decimals, and percents**

Order the numbers 34%,  $\frac{6}{25}$ , and 0.22 from least to greatest, and graph them on the number line.

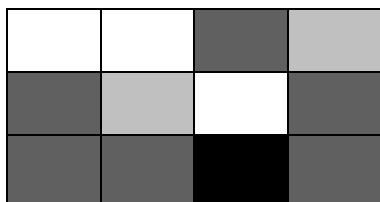
5. Use your calculator to convert 34% to a decimal. \_\_\_\_\_
6. Use your calculator to convert  $\frac{6}{25}$  to a decimal. \_\_\_\_\_
7. Write the numbers in order from least to greatest. \_\_\_\_\_
8. Graph the numbers on the number line.



**Problem 3 – Write a number as a fraction, decimal, or percent**

Complete the table. Write the number of white, light grey, dark grey, and black rectangles as a fraction, decimal, and percent. Use your calculator to convert the numbers.

*Note:* Simplify fractions to lowest terms.



Color	Number	Fraction	Decimal	Percent
white				
light grey				
dark grey				
black				

**Problem 4 – Use data to make a circle graph**

Use the data from the table to create a circle graph on your calculator.

Enter the color names into list **L1**.

**Step 1:** Press  $\boxed{\text{LIST}}$   $\boxed{2\text{nd}}$   $\boxed{\text{MATH}}$ . Use the arrow keys to move the cursor to select the quotation mark first.

Select the letters W, H, I, T, and E. Select the quotation mark again. Then select **Done**, and press  $\boxed{\text{ENTER}}$  on the lists screen.

**Step 2:** Press  $\boxed{2\text{nd}}$   $\boxed{\text{MATH}}$ . Repeat the steps above to the enter LGREY, DGREY, and BLACK into **L1**.

**Step 3:** Enter the fractions into list **L2**.

Set up the circle graph as shown at the right.

**Step 4:** Press  $\boxed{2\text{nd}}$   $\boxed{\text{Y=}}$  to reach the **STAT PLOTS** menu. Press  $\boxed{\text{ENTER}}$  to select **Plot1**.

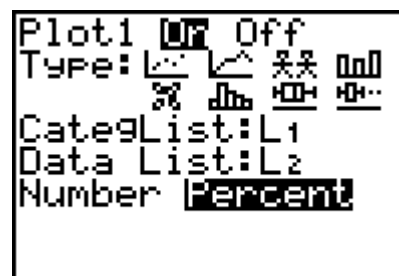
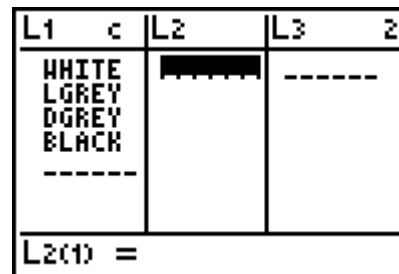
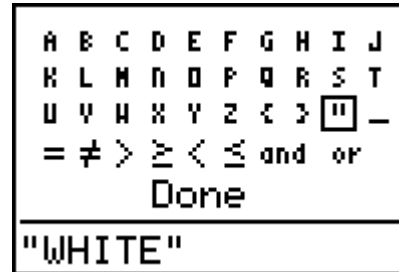
**Step 5:** Press  $\boxed{\text{ENTER}}$  to turn **Plot1** on.

Use  $\boxed{\blacktriangleright}$  to select the circle graph as **Type**.

Set **CategList:** L1 and **Data List:** L2. Press  $\boxed{2\text{nd}}$   $\boxed{\text{LIST}}$ . Press  $\boxed{1}$  for L1 and  $\boxed{2}$  for L2.

Press  $\boxed{\text{ENTER}}$  on **Percent**.

**Step 6:** Press  $\boxed{\text{GRAPH}}$  to show the circle graph of the data.



Sketch your graph.

