Estimation Station
ID: 11918

<div align="right">

Time required
45 minutes

</div>

Activity Overview

In this activity, students will use a Pie Chart to help them round fractions and mixed numbers. Then they will use their rounding skills to estimate sums and differences.

Topic: Numbers and Operations

- *Estimation*
- *Adding and subtracting fractions*

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.*
- *Students will need to know how to enter mixed numbers using the Unit key to add and subtract.*
- *If time is a consideration, Problem 4 can be used as an extension. The included program for this problem will need to be downloaded to students' calculators in advance.*
- ***To download the student worksheet, calculator program, and TI-Navigator files, go to education.ti.com/exchange and enter "11918" in the quick search box.***

Associated Materials

- *MGAct06_EstimationStation_worksheet_TI73.doc*
- *FRACTION (program)*
- *MGAct06_Nav01_TI73.act*
- *MGAct06_Nav02_TI73.act*
- *MGAct06_LrnChk_TI73.edu*

Suggested Related Activities

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

- *Estimating with Rational Numbers (TI-73 with TI-Navigator) — 6683*
- *In Round Numbers (TI-15 Explorer) — 4974*
- *Somewhere In Between (TI-73 Explorer) — 4487*

Before beginning the activity make sure that the following has been done.

- all lists have been cleared ([2nd] [0] and select **ClrAllLists**)

- all plots have been turned off ([2nd] [Y=] and select **PlotsOff**)

- all equations have been turned off ([2nd] [PRGM] [2nd] [MATH], select **F** and then **FnOff**)

Problem 1 – Rounding Fractions

Students will use a pie chart to help them determine whether to round to the nearest whole number or nearest half. In the List editor, students will change the numbers in list L2 for each problem. They can press [LIST] and [GRAPH] to move back and forth between the lists and the chart. After the first setup of the plot, students will not need to return to the setup screen.

The section labeled 1 represents the fraction. Explain to students that the chart only shows the fraction part of the mixed number. The percentages of the sections are shown in the top left corner of the screen. Students should see that the percentage of section 1 will be close to 0 or 100 when they round to the nearest whole number and the percentage will be close to 50 when they round to the nearest half.
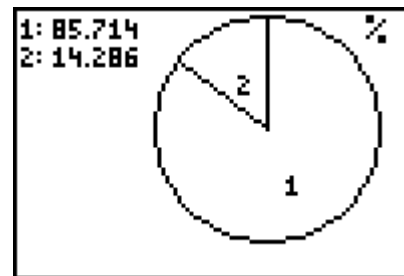
Students should also observe that when the numbers in list L2 are about the same, they round to the nearest half and when the numbers are very different, they round to the nearest whole.

Problem 2 – Estimating Sums

Encourage students to round each individual fraction and then estimate the sum before finding the exact answer using technology.

Pay attention to students that are just adding the whole numbers instead of rounding each fraction to the nearest half.
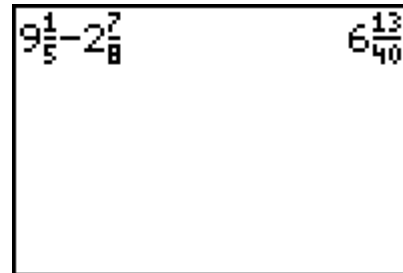
To evaluate Exercise 9, press [2] [UNIT] [7] [b/c] [8] [▶] [+] [4] [UNIT] [8] [b/c] [3] [ENTER].

Problem 3 – Estimating Differences

Questions 14-17 are very similar to Questions 9-12. Students, again, should round the fractions first and estimate the difference.

Entering fractions will be done as in the previous exercises. Just insert ⊟ instead of ⊞ for the operation.

```
9 1/5 – 2 7/8          6 13/40
```

Problem 4 – Random Rounding

Send the program for this activity, **FRACTION**, to students' calculators. Have students execute the program to generate random fractions to use in addition and subtraction estimation. The command for generating the random fractions is shown at the right. You can edit the program to generate fractions between different whole number by altering the **randInt(** command.

```
PROGRAM:FRACTION
:randInt(1,10,1)
+round(rand,2)▶F
◄→D
:
```

To execute the program, press PRGM and then use the ⊡ and ⊡ to select the program. Press ENTER to copy the program name to the home screen. Then press ENTER again to execute the program to generate the first number. Press ENTER again to generate the second fraction.

```
prgmFRACTION
          (7␣1/5)
prgmFRACTION
          (9␣31/100)
```
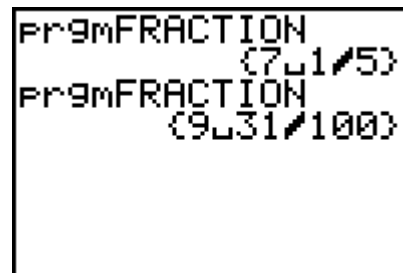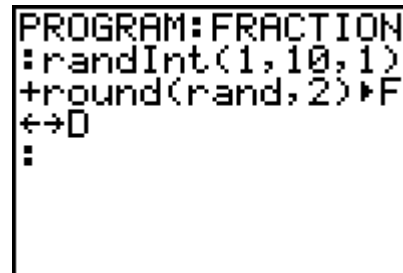
Solutions to Student Worksheet

<u>Problem 1</u>

1. 5

2. $2\frac{1}{2}$

3. 9 or $9\frac{1}{2}$

4. 4

5. $3\frac{1}{2}$

6. 7

7. Sample answer: Close to 0 or 100 when rounded to the nearest whole number. Close to 50 when rounded to the nearest half.

8. Sample answer: About the same; Very different.

<u>Problem 2</u>

9. Round: $3+4\frac{1}{2}$, Answer: $7\frac{51}{104}$

10. Round: 9+3, Answer: $12\frac{8}{117}$

11. Round: $6\frac{1}{2}+7$, Answer: $13\frac{8}{15}$

12. Round: $4+9\frac{1}{2}$, Answer: $13\frac{36}{85}$

13. Answers will vary.

14. Round: 9-3, Answer: $6\frac{13}{40}$

15. Round: $6\frac{1}{2}-3$, Answer: $3\frac{1}{9}$

16. Round: $4\frac{1}{2}-7\frac{1}{2}$, Answer: $-3\frac{5}{39}$

17. Round: 8-4, Answer: $4\frac{3}{10}$

18-21. Answers will vary depending on fractions generated. Check that addition and subtraction is correct for given fractions.

Extension – TI-Navigator™

1. Load the ***MGAct06_Nav01_TI73.act*** activity settings file into Activity Center. This sets up the Activity Center so that students will have a number line (from –4 to 4) on their calculator. You may choose to click Configure and type a number that will appear as a prompt on the student calculators. You can also change the length of the number line as you see fit as well as the step size.

    Call out a fraction (proper or mixed), such as $1\frac{3}{8}$ and instruct students to estimate the

    fraction's value to the nearest $\frac{1}{2}$. Then instruct them to mark this location just above the

    number line.

    Once all students have marked their position, instruct them to send it. Discuss the results

    and use this opportunity to let students know that rounding fractions to the nearest $\frac{1}{2}$ can

    help them estimate operations on fractions.

    You can redo this activity several times (clear the activity data each time) using a variety of proper and mixed fractions.

2. Load the ***MGAct06_Nav02_TI73.act*** activity settings file into Activity Center. This sets up the Activity Center so that students will have a number line (from –9 to 9) on their calculator.

    Call out the sum or difference of two fractions (proper or mixed), such as $3\frac{6}{7} + 1\frac{2}{3}$ and

    instruct students to estimate the value of the sum or difference using the benchmarks from

    exercise 1. For example, students should be encouraged to think of $3\frac{6}{7}$ as 4 and $1\frac{2}{3}$ as

    $1\frac{1}{2}$, giving a sum of $5\frac{1}{2}$. Have students mark and send this location like in Exercise 1.

    Depending on the ability level of your students, you may want to work with signed numbers as well. You can redo this activity several times (clear the activity data each time) using a variety of proper and mixed fractions.

3. Send students the LearningCheck™ file ***MGAct06_LrnChk_TI73.edu***. They will have five products and five quotients to estimate. Collect their answers and use **Class Analysis** to review the results and provide additional clarification.