Smart Shoppers
ID: 12135

Time required
45 minutes

Activity Overview
In this activity, students will compare ratios with different denominators, and then with common denominators. They will also find unit rates.

Topic: Ratios and Rates
- *Compute fluently and make reasonable estimates*

- *Develop, analyze, and explain methods for solving problems involving proportions, such as scaling and finding equivalent ratios*

Teacher Preparation and Notes
- *Students should already be familiar with multiplying fractions.*

- *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 TI-Navigator file, go to education.ti.com/exchange and enter "12135" in the quick search box.***

Associated Materials
- *MGAct14_RatiosRates_worksheet_TI73.doc*

- *MGAct14_RatiosRates_Nav_TI73.act*

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

- *Smart Shoppers (TI-73 Explorer with TI-Navigator) — 6684*

- *Golden Ratio (TI-73 Explorer with TI-Navigator) — 3927*

- *Do Centimeters Make Me Taller? (TI-15 Explorer) — 5720*

Part 1 – Comparing Ratios

In the first set of questions, students will use <, >, and = to compare ratios. The comparison symbols are found in the [TEXT] menu. Students are to use the arrow keys to move to the needed symbol, press [ENTER] to copy the symbol to the bottom row, then move to **Done** and press [ENTER].
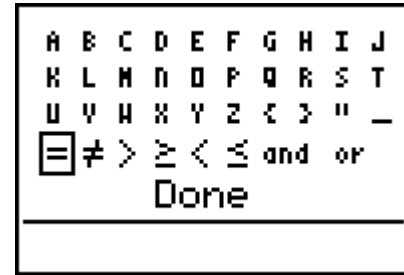
Explain to students that **1** represents True and **0** represents False.

Problems 1–3

Students can discuss in pairs or small groups which ratio they think is greater (or if they think they are equal). They should give reasoning for their thoughts.

Enter each ratio as a fraction and insert one of the comparisons between. In this example, press ③ ⊡ ⑤ ⓑ⁄ᶜ ② ④ ▸ then [2nd] [MATH] and choose the <, >, or =, and then ② ⊡ ④ ⓪ ⓑ⁄ᶜ ① ⑥. Press [ENTER].
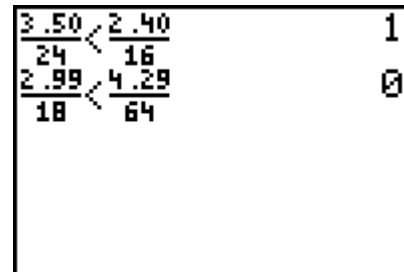
Part 2 – Writing Equivalent Ratios

In some comparison cases, it will be relatively easy to convert both ratios to a common denominator. When an LCM can easily be found, students can change both fractions to have a common denominator.

Problems 4–6

In this set of problems, students should find a common denominator to compare ratios. If they are not confident that they have converted the ratio correctly, students can use the = symbol to compare the original ratio to the ratio with a common denominator.

Press the following to compare two ratios.

③ ⊡ ⑤ ⓪ ⓑ⁄ᶜ ② ④ ▸ [2nd] [MATH] and move to =, press [ENTER], move to Done, and press [ENTER] again. Enter the second ratio, pressing ⑦ ⓑ⁄ᶜ ④ ⑧ and press [ENTER].
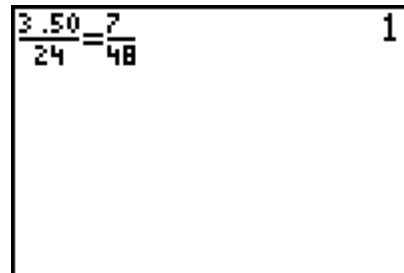
Problem 7

Students should realize that when an LCM is easily found, they could convert each ratio to a common denominator. Having a common denominator makes it easier to compare ratios.

Part 3 – Writing Unit Rates

<u>Problems 8–12</u>

In each question, students should simply divide each ratio and find a unit rate.

Press the following for Question 8. ⁅2⁆ ⁅.⁆ ⁅8⁆ ⁅9⁆ ⁅÷⁆ ⁅1⁆ ⁅5⁆ ⁅ENTER⁆ and ⁅3⁆ ⁅.⁆ ⁅2⁆ ⁅9⁆ ⁅÷⁆ ⁅1⁆ ⁅9⁆ ⁅ENTER⁆. This shows that one ounce is $0.19 for the first option and $0.17 for the second package, proving that the second package is the better deal.

```
2.89/15
         .1926666667
3.29/19
         .1731578947
```
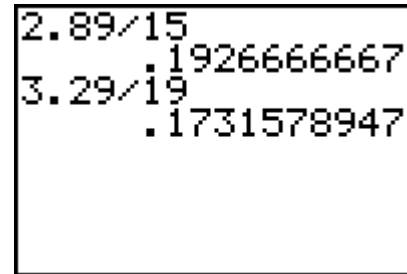
Solutions – student worksheet

<u>Part 1</u>

1. Box 1

2. Jug 2

3. Package 2

<u>Part 2</u>

4. $\dfrac{7}{48}$, $\dfrac{7.20}{48}$, Box 1

5. $\dfrac{8}{24}$, $\dfrac{6}{24}$, Package 1

6. $\dfrac{5.80}{36}$, $\dfrac{4}{36}$, Package 2

7. When a common denominator can easily be found, using the LCM to compare ratios is a good idea.

<u>Part 3</u>

8. $0.19, $0.17, package 2

9. $0.07, $0.07, equal to 2 decimal places. If students show more decimal places, the second package is a very slightly better deal.

10. $9.33, $5, option 2

11. $1.80, $1.92, package 1

12. When it is not easy to find a common denominator, it may be easiest to convert to a unit rate.

Extension – TI-Navigator™

1. Throughout the lesson, use **Screen Capture** to check student work. **Quick Poll** can also be used to gauge the class opinion on any individual item.

2. Load the *MGWeek14_RatiosRates_Nav_TI73.act* activity settings file. This will show a number line that can be used to have students place their ratios on the number line. Students can then visually see which ratio is greater.

    The upper and/or lower boundaries for the number line may need to be adjusted based on the different exercises.

3. Have students do a search on the internet for a product they may want to buy. Students should share the price comparisons they found and then other students should determine the best way to compare them. Use **Quick Poll** to see if the class feels finding the LCM or unit rate is the best way to compare.