EXPLORATIONS

Activity 2

Factors Galore A: Common Factors

Students will use the calculator to simplify fractions and investigate common factors and the greatest common factor of the numerator and denominator.

Concept

- Number sense/numeration

Skill

- Finding common factors, greatest common factor
- Simplifying fractions
- Prime factorization
- Calculator skills: Mode, [b/c], [SIMP]

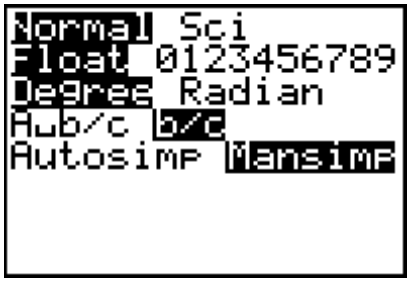
Materials

- Student Activity sheets (page 8)
- TI-73 calculators

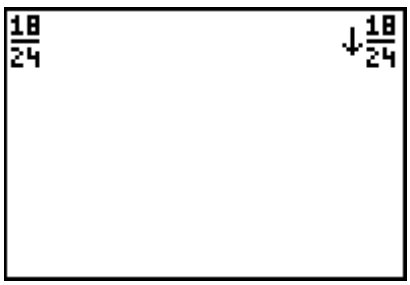
Activity

Before doing this activity, students should have some experience with simplifying fractions, prime numbers, and prime factors.

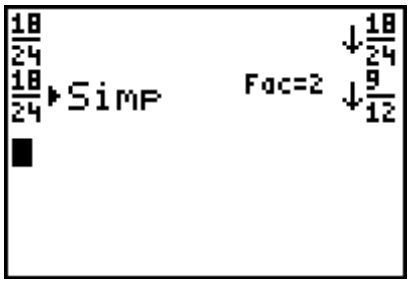
***Note**: Make sure the calculator is set to **Mansimp** to manually simplify fractions and to **b/c** to input fractions. To do this:*



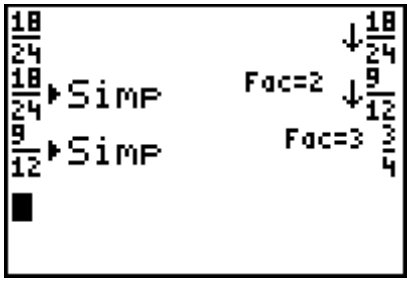
1. Press [MODE], use the arrows to move down and over to [b/c], and press [ENTER].
2. Move to **Mansimp** and press [ENTER].
3. Press [2nd] [QUIT] to return to the Home screen.
4. Have the students enter each fraction from the Student Activity sheet into the Home screen of the calculator by typing the numerator, pressing [b/c], typing the denominator, and pressing [ENTER]. The arrow next to the fraction shows that the fraction can be simplified. Discuss with students how they know that the fraction is unsimplified. For example, in $\frac{18}{24}$, the numerator and denominator are both even, so we know that 2 is a common factor. Before continuing with the activity, you may want to show examples of other unsimplified fractions on the board and discuss with students how they can be simplified.



5. Press SIMP ENTER. The calculator displays the new fraction and the lowest prime factor of the numerator and denominator. Record this factor on the recording sheet under **Prime Factors**.



Discuss what the second line on the calculator screen means. (Divide by 2.) On the back of the Student Activity sheet, have the students write the arithmetic used to get the simplified fraction. For example, in the window at the right,



$\frac{18}{24}$ **Simp Fac=2** would be written as

$\frac{18\div2}{24\div2} = \frac{9}{12}$. Since we are dividing by 2 (a common factor), $\frac{18}{24} = \frac{9}{12}$.

Continue discussing other lines of simplification.

6. Repeat the SIMP, ENTER, record process until the fraction is completely simplified. (The arrow will disappear.)

Review what a greatest common factor is. (The largest factor that the numerator and denominator have in common.) Guide students to discover that 6 (or 2 x 3) is the greatest common factor of $\frac{18}{24}$. Have them record this under **GCF** on the Student Activity sheet. To verify that the original fraction can be simplified using the GCF of 6, enter **18** b/c **24** SIMP **6** ENTER.

Wrap-Up

Discuss the process the calculator is using to simplify fractions.

There is a possibility that students will misunderstand the mathematics of division by 1 since the calculator only shows the prime factor and not that the calculator is dividing both numerator and denominator by this prime factor. Students may not understand that they are dividing by 1 in the form of $\frac{\text{GCF}}{\text{GCF}}$.

Have the students work the problem backwards by taking the simplified fraction and multiplying it by 1 in the form of $\frac{\text{GCF}}{\text{GCF}}$ to verify that the simplified fraction is equivalent to the original fraction.

Students need to show the mathematics, not just the calculator screen. Encourage them to show that they understand the step-by-step process of how simplification works.

Assessment

Ask students to explain in writing the process that is being used to simplify fractions. Can this be done another way? (Finding the GCF in one step.) Explain.

Extension

- Investigate exponents found in the completed table. For example, in the fraction $\frac{128}{640}$, the prime factorization is 2 x 2 x 2 x 2 x 2 x 2 x 2 or 2^7.

Student Activity

Name _____

Date _____

Activity 2

Factors Galore A: Common Factors

Simplify each of the fractions in the table.

FRACTION	PRIME FACTORS	GCF	$F \div \frac{GCF}{GCF}$	SIMPLIFIED FRACTION
$\frac{18}{24}$	2, 3	6	$\frac{18}{24} \div \frac{6}{6}$	$\frac{3}{4}$
$\frac{70}{112}$				
$\frac{128}{640}$				
$\frac{343}{735}$				
$\frac{121}{165}$				
$\frac{242}{528}$				
$\frac{144}{156}$				
$\frac{480}{512}$				
$\frac{405}{729}$				
$\frac{236}{944}$				
$\frac{120}{168}$				
$\frac{644}{736}$				
$\frac{180}{432}$				

1. Explain what the calculator is doing to simplify these fractions.

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2. Explain how you found the GCF.

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