



#10136

BASIC MATH: ADDING AND SUBTRACTING FRACTIONS

CEREBELLUM CORPORATION, 2001

Grade Level: 4-8

14 mins.

2 Instructional Graphics Enclosed

DESCRIPTION

Determining a common denominator is essential before adding and subtracting fractions. Defines prime and composite numbers, as they relate to factors. Carefully explains finding the lowest common denominator. Standard Deviants School.

ACADEMIC STANDARDS

Subject Area: Mathematics

- Standard: Understands and applies basic and advanced properties of the concepts of numbers
 - ◆ Benchmark: Understands the characteristics and properties (e.g., order relations, relative magnitude, base-ten place values) of the set of rational numbers and its subsets (e.g., whole numbers, fractions, decimals, integers) (See INSTRUCTIONAL GOALS 2, 3, and 4.)
 - ◆ Benchmark: Understands basic number theory concepts (e.g., prime and composite numbers, factors, multiples, odd and even numbers, divisibility) (See INSTRUCTIONAL GOALS 2 and 3.)
 - ◆ Benchmark: Uses number theory concepts (e.g., divisibility and remainders, factors, multiples, prime, relatively prime) to solve problems (See INSTRUCTIONAL GOALS 2, 3, and 4.)
- Standard: Uses basic and advanced procedures while performing the processes of computation
 - ◆ Benchmark: Adds, subtracts, multiplies, and divides whole numbers, fractions, decimals, integers, and rational numbers (See INSTRUCTIONAL GOALS 1.)

INSTRUCTIONAL GOALS

1. To explain how to do addition and subtraction of fractions.
2. To review factors and factoring.
3. To identify prime and composite numbers.
4. To define *lowest common denominator* and explain how to find it.

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VOCABULARY

- | | | |
|----------------|--------------|------------------|
| 1. add | 7. divide by | 13. prime |
| 2. altered | 8. factors | 14. reduce |
| 3. combine | 9. fractions | 15. simplify |
| 4. common | 10. lowest | 16. subtract |
| 5. composite | 11. multiple | 17. value |
| 6. denominator | 12. original | 18. whole number |

BEFORE SHOWING

1. Review the basics of fractions, including the basic terminology of numerator, denominator, etc.
2. Review factors and factoring.
3. Copy and distribute the "Adding and Subtracting Fractions: Viewing Guide." (See INSTRUCTIONAL GRAPHICS.)
 - a. Encourage students to follow along on the guide with the video.
 - b. Explain that they will have time to complete the problems either during pauses of the video or after viewing.

DURING SHOWING

1. View the video more than once, with one showing uninterrupted.
2. Pause after the examples of adding and subtracting fractions with common denominators.
3. Allow students time to do the problems on the viewing guide.
4. Discuss and resolve any issues. Do further examples if necessary.
5. Pause after the explanation of prime and composite numbers. Discuss and clarify. Do factoring of more numbers to find additional examples of prime and composite numbers.
6. Pause to discuss how to find the lowest common denominator (LCD) when the denominators are prime numbers. Write the LCD for $1/3$ and $1/5$ on the viewing guide.
7. Pause to clarify why denominators with no common factors are multiplied to get the LCD. Practice several examples.
8. Pause after the explanation for finding the LCD for 4 and 10. Discuss how this was done. Practice additional examples.
9. Pause after the example of adding $7/12 + 5/18$. Review the steps. Record the work for each step on the viewing guide where it says "The Big Example."

AFTER SHOWING

Discussion Items and Questions

1. What is done before adding or subtracting fractions?
2. Explain how to add or subtract fractions with the same denominator.
3. Define *composite* and *prime numbers*. Why is it important to know the difference between these two kinds of numbers?
4. Why do you need to find the lowest common denominator before you add or subtract fractions with different denominators?

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5. Explain how to find the lowest common denominator (LCD) if the denominators are prime numbers.
6. Explain how to find the LCD if the denominators are composite numbers. When do you multiply composite denominators together to get the LCD?
7. Define *multiples*.

Applications and Activities

1. Review the information from the video using the viewing guide.
2. Complete the "Adding and Subtracting Fractions: Check Your Knowledge" worksheet. (See INSTRUCTIONAL GRAPHICS.)
3. Note that the viewing guide has "Word Problem Strategies" at the bottom of the page that were not explained in the video.
 - a. Read and explain these steps.
 - b. Practice each step while doing "fraction" word problems together.
4. Note that the viewing guide has "Word Problem Strategies" at the bottom of the page that were not explained in the video.
 - a. Read and explain these steps.
 - b. Practice each step while doing "simple" word problems together.
5. Practice solving more fraction word problems following the steps on the viewing guide. Examples include stories about Jon Johnson and his four pet alligators:
 - a. Jon Johnson decides to make swamp pies for his pet alligators. The recipe calls for $2 \frac{3}{4}$ cups of flour for four pies. Jon decides his alligators can eat two pies apiece. How much flour does he need? (2 cups)
 - b. Jon spends $\frac{1}{6}$ of his money on alligator food. He spends $\frac{1}{4}$ of his money on his alligator cage and $\frac{1}{3}$ of his money on basic necessities, like food. How much of his money does he have left to spend on other things? ($\frac{1}{4}$)
 - c. Of the alligators' diet, $\frac{1}{3}$ is fish and $\frac{1}{4}$ is swamp pie. The rest of their diet is French fries. How much of their diet is French fries? ($\frac{5}{12}$)
 - d. Jon ate one piece of a pizza and left the remainder, $\frac{5}{6}$ of a pizza, on his back porch. Of the remaining $\frac{5}{6}$ of the pizza, his alligators ate three slices. How much is left? ($\frac{1}{3}$)
6. In small groups or pairs, write original word problems involving adding and subtracting fractions. Exchange problems with another group and solve.
7. Order several uncut pizzas from a local pizzeria.
 - a. Cut each pizza into a different number of equal parts.
 - b. Pass out slices of pizza for the class to eat.
 - c. Add the fractional parts of pizza that are eaten.
8. Design a bulletin board display illustrating the rules for adding and subtracting fractions with like denominators and unlike denominators.
9. Select three recipes for making cakes. Determine the total measures of each ingredient if all three cakes were to be made.

CMP RELATED RESOURCES

- *Ace Math for Kids: Volume II, Part 4 #3559*
- *Basic Math: Fraction Basics #10138*
- *Basic Math: Multiplying and Dividing Fractions #10140*
- *Fractions and All Their Parts—Part I #3245*
- *Fractions and All Their Part –Part III #3249*

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World Wide Web



The following Web sites complement the contents of this guide; they were selected by professionals who have experience in teaching deaf and hard of hearing students. Every effort was made to select accurate, educationally relevant, and "kid safe" sites. However, teachers should preview them before use. The U.S. Department of Education, the National Association of the Deaf, and the Captioned Media Program do not endorse the sites and are not responsible for their content.

• FRACTIONS

<http://www.math.com/school/subject1/lessons/S1U4L1GL.html>

Multiple-page Web site with explanations of adding, subtracting, and reducing fractions. Also has an interactive "workout" of online fraction problems.

• E-LAB GRADE 4

http://www.harcourtschool.com/activity/elab2002/grade_4/

This site provides several visual interactive models related to the concepts in the video. Try "Prime and Composite Numbers" or any of the fractions sections. Additional materials are available on the 5th and 6th grades sections of this site.

• AAA MATH: FRACTIONS

<http://www aaamath com/B/fra.htm>

Find a whole range of fraction activities, each with an explanation, interactive practice, and games.

• MATH FORUM: ASK DR. MATH

<http://forum.swarthmore.edu/dr.math/>

"Ask Dr. Math" allows users to e-mail questions to Dr. Math and access archived material. For other materials that relate to this media, choose "Elementary" and then "Fractions/Decimals" or "Prime Numbers," or choose "Middle School" and then "Factoring Numbers" or "Fractions/Percents."

INSTRUCTIONAL GRAPHICS

- ADDING AND SUBTRACTING FRACTIONS: VIEWING GUIDE
- ADDING AND SUBTRACTING FRACTIONS: CHECK YOUR KNOWLEDGE

Adding and Subtracting Fractions: Basic Math Viewing Guide

Show your work and solve the problems with the program!
Your teacher will be asking you for the answers!

Addition: Have the same denominator? Just add the numerators together. $\longrightarrow \frac{1}{6} + \frac{1}{6} =$

Subtraction: Have the same denominator? Just subtract the numerators. $\longrightarrow \frac{6}{6} - \frac{2}{6} =$

Reducing Fractions: Divide by the common factors. $\longrightarrow \frac{4}{6} = \frac{4 \div 2}{6 \div 2} =$

Gasp! We don't have the same denominator! Just keep watching!

Factors

- **Prime number:** Any number whose only factors are 1 and itself.

Examples: 1, 2, 3, 5, 7, 11, 13, 17, 19

- **Composite number:** Any number that has more factors than just 1 and itself.

Examples: 4, 6, 8, 9

Finding the Lowest Common Denominator (LCD)

- For prime numbers, the LCD is (denominator 1) x (denominator 2).

$$\frac{1}{3} + \frac{1}{5} =$$

- For numbers with no common factors, the LCD is also (denominator 1) x (denominator 2).

8 and 9 have no common factors other than 1

8: 1, 2, 4, 8

$$8 \times 9 = 72$$

9: 1, 3, 9

72 is the LCD

- For composite numbers with common factors, the LCD is the smallest number they both share.

4 and 10 have common factors (1, 2)

4: 4, 8, 12, 16, **20**, 24, 28, 32, 36, 40

10: 10, **20**, 30, 40

20 is the LCD

The Big Example

Lowest Common Denominator

$$\frac{7}{12} + \frac{5}{18} =$$

12 18

24 36

36 54

$$\frac{7}{12} \times \frac{3}{3} =$$

$$\frac{5}{18} \times \frac{2}{2} =$$

$$\frac{7}{12} + \frac{5}{18} =$$

Word Problem Strategies

Remember R.I.O.T.S.

Read

Identify

Out of here!

Translate

Solve

the problem.

what you must solve.

Remove all unnecessary information.

the word problem into a math problem; break it down into logical steps. the problem.

Adding and Subtracting Fractions: Check Your Knowledge

A. Adding Fractions

Solve each problem. Show your work (3 points each).

1. $\frac{7}{9} + \frac{1}{5} =$

2. $\frac{2}{8} + \frac{4}{8} + \frac{1}{8} =$

3. $\frac{6}{4} + \frac{2}{3} =$

4. $\frac{1}{10} + \frac{6}{7} =$

5. $\frac{1}{3} + \frac{12}{39} =$

6. $\frac{15}{25} + \frac{15}{20} =$

B. Subtracting Fractions

Solve each problem. Show your work (3 points each).

1. $\frac{5}{4} - \frac{2}{3} =$

2. $\frac{7}{5} - 1 =$

3. $\frac{6}{8} - \frac{1}{4} =$

4. $\frac{7}{10} - \frac{3}{7} =$

5. $\frac{21}{30} - \frac{7}{20} =$

6. $\frac{42}{76} - \frac{3}{19} =$

C. Word Problems

Solve each problem. Show your work (2 points each).

1. John drives 1 mile to get to his job at the Happy Hoedown Hamburger House. One day he drove $1/3$ of the way to work before he realized he had left his lucky spatula at home. He returned home, grabbed his spatula, and then drove them all the way to work. How far did he drive in all?
2. A park measures $7/9$ of a mile across. David decides to walk from one end of the park to the other. His brother Daniel runs after him. Daniel catches up to David $4/9$ of a mile through the park. How far did David walk?

Adding and Subtracting Fractions: Basic Math Check Your Knowledge **Answer Key**

 Total Score
/ 50
A. Adding Fractions

Solve each problem. Show your work (3 points each).

1. $\frac{7}{9} + \frac{1}{5} =$

$$\frac{35}{45} + \frac{9}{45} = \frac{43}{45}$$

2. $\frac{2}{8} + \frac{4}{8} + \frac{1}{8} =$

$$\frac{7}{8}$$

3. $\frac{6}{4} + \frac{2}{3} =$

$$\frac{18}{12} + \frac{8}{12} = \frac{26}{12} = 2\frac{1}{6}$$

4. $\frac{1}{10} + \frac{6}{7} =$

$$\frac{7}{70} + \frac{60}{70} = \frac{67}{70}$$

5. $\frac{1}{3} + \frac{12}{39} =$

$$\frac{13}{39} + \frac{12}{39} = \frac{25}{39}$$

6. $\frac{15}{25} + \frac{15}{20} =$

$$\frac{60}{100} + \frac{75}{100} = \frac{135}{100} = 1\frac{7}{20}$$

B. Subtracting Fractions

Solve each problem. Show your work (3 points each).

1. $\frac{5}{4} - \frac{2}{3} =$

$$\frac{15}{12} - \frac{8}{12} = \frac{7}{12}$$

2. $\frac{7}{5} - 1 =$

$$\frac{7}{5} - \frac{5}{5} = \frac{2}{5}$$

3. $\frac{6}{8} - \frac{1}{4} =$

$$\frac{6}{8} - \frac{2}{8} = \frac{4}{8} = \frac{1}{2}$$

4. $\frac{7}{10} - \frac{3}{7} =$

$$\frac{49}{70} - \frac{30}{70} = \frac{19}{70}$$

5. $\frac{21}{30} - \frac{7}{20} =$

$$\frac{42}{60} - \frac{21}{60} = \frac{21}{60}$$

6. $\frac{42}{76} - \frac{3}{19} =$

$$\frac{42}{76} - \frac{12}{76} = \frac{30}{76} = \frac{15}{38}$$

C. Word Problems

Solve each problem. Show your work (2 points each).

1. John drives 1 mile to get to his job at the Happy Hoedown Hamburger House. One day he drove 1/3 of the way to work before he realized he had left his lucky spatula at home. He returned home, grabbed his spatula, and then drove them all the way to work. How far did he drive in all?

$$1/3 \text{ (way there)} + 1/3 \text{ (way back)} + 1 \text{ (entire trip)} = 1\frac{2}{3} \text{ miles}$$

2. A park measures 7/9 of a mile across. David decides to walk from one end of the park to the other. His brother Daniel runs after him. Daniel catches up to David 4/9 of a mile through the park. How far did David walk?

$$4/9. \text{ Sometimes word problems will have more information than you need.}$$