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DepED
DEPARTMENT OF EDUCATION

Mathematics

Quarter 1 – Module 1: Addition and Subtraction of Fractions

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What I Need to Know

Good day everyone!

Today, we are going to explore things about numbers especially that it is a need for the subsistence of all learners in your daily life.

Numbers play a substantial role in our daily existence. You use numbers in many ways. Whether you use it for measurement of your food intake; the number that can influence your decisions related to your daily activity; the number of scores you get in playing video games and lessons and the like, numbers really helps you. It can be a guide to support your growth and development as a person which relates you to your effectiveness, responsibility and other dominions.

Moreover, numbers include decimals, fractions and percentages, which are equally important when you dwell with decision making and problem solving.

On this chapter, you are going to further learn what a fraction is. I believe that you already encountered the simple fractions in the previous grades. This module was designed and was written with you in mind. It's here to help you master the addition and subtraction of simple and mixed fractions.

The scope of this module permits it to be used in many different learning situations. The language used recognizes the diverse vocabulary level of students considering you as the center of the learning and exploration about these lessons. The lessons are arranged to follow the standard sequence of the course. But the order in which you read them can be changed to correspond with the textbook you are now using.

The module covers the addition and subtraction of simple fractions and mixed numbers without or with regrouping.

After going through this module, you are expected to:

1. Add and subtract simple fractions without or with re-grouping;
2. Add and subtract mixed numbers without or with re-grouping;

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What I Know

Now, for this module, fractions will be thoroughly to fully understand it.

Before we start your lessons, there is a need for you to know what you have learned from your previous lesson about fractions by working on this activity and to prepare you for the next lessons. Take this pretest.

Pre-Test. Add or subtract the following fractions. Reduce your answer to lowest term if possible.

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

2. $2\frac{7}{21} + 5\frac{8}{7} =$

3. $8\frac{3}{16} - 3\frac{4}{24} =$

4. $88 - 4\frac{9}{12} =$

5. $23 + 17\frac{7}{8} =$

6. $5\frac{2}{3} - 4\frac{1}{3} =$

7. $\frac{5}{6} - \frac{1}{6} =$

8. $7\frac{7}{8} + 4\frac{5}{8} =$

9. $\frac{7}{10} - \frac{8}{15} =$

10. $6\frac{4}{9} + \frac{9}{18} =$

Lesson 1 Addition and Subtraction of Fractions

This module explains that fractions are expressed as a division calculation, one number divided by another. They are also commonly expressed as one number over another.

A **fraction** is a part of a whole. It has two parts: numerator, on the top, and the denominator, on the bottom, $\frac{numerator}{denominator}$. The **numerator** tells the number of parts taken. The **denominator** tells the number of equal parts of a whole is divided.

$\frac{3}{6}$ - numerator

$\frac{3}{6}$ - denominator

What's In

Let's go over to the past lesson you have learned so you could be able to understand better as we go along to this lesson. There are some basic terms and rules of fractions to consider such as the following:

Similar Fractions are fractions with the same denominator, such as $\frac{3}{6}$ **and** $\frac{4}{6}$.**Dissimilar Fractions** are fractions with different denominators, such as $\frac{3}{5}$ **and** $\frac{2}{7}$.**Mixed Fractions** is composed of whole number and fraction, such as $2\frac{1}{2}$ **and** $8\frac{2}{6}$.

To add and subtract dissimilar fractions, you need to find the smallest number that can be divided by the denominators. This is called the **Least Common Denominator or LCD.**

To simplify a fraction, divide both the top and bottom by the **Greatest Common Factor or GCF.** It is the highest number that divides exactly into two or more numbers.

HINTS: When working with fractions, they are always expressed as the smallest possible set of (whole) numbers. In other words, if the bottom number divides by the top number, divide it down (reduce it) until you can no longer do so.

Example:

$\frac{3}{12} = \frac{1}{4}$. The numerator (3) and denominator (12) are both divided by 3.

In the same way: $\frac{7}{21} = \frac{1}{3}$

$\frac{5}{10} = \frac{1}{2}$. Here both numerator and denominator are divided by 2.

Sometimes the bottom number does not divide by the top number, but they both divide by some other number. In mathematical terms, this means that they have a common factor.

In such cases, divide both numbers by the common factor until one or both are either prime numbers, or they have no more common factors.

Example:

$\frac{28}{70} = \frac{14}{35} = \frac{2}{5}$. Divide first by 2 and then by 7. Hence, the greatest common factor is 14 (multiplying 2 and 7).

$\frac{25}{40} = \frac{5}{8}$. Divide by 5.

$\frac{9}{23}$. Cannot be reduced, as 23 is a prime number so cannot be divided by anything except itself and one.

Alright! This activity will determine how much have you learned in finding the Least Common Denominator (LCD) and Greatest Common Factor (GCF). So that you could be able to add and subtract fractions and mixed fractions as well.

A. Find the LCD of the following:

1. $\frac{3}{7}$ and $\frac{5}{10}$ =

2. $\frac{7}{24}$ and $\frac{3}{48}$ =

3. $\frac{12}{20}$ and $\frac{15}{30}$ =

B. Find the GCF of the following:

1. 9 and 21 =

2. 12 and 24 =

3. 45 and 60 =

What's New

Hello there! Now, that you have mastered the activity given to you for sure you will find it easy to go through the next episode. However, it's a bit more of challenge when you go deeper to the next lesson.

Notes to the Teacher

Students need significant time and experiences to develop a deep conceptual understanding of fractions. It is important for a teacher to help students see how fractions are alike and different from whole numbers.

This time get ready to add and subtract fractions and even mixed fractions. You might think that the easiest fractions to add or subtract are those with the same denominator. You simply add or subtract the two numerators and place them over the same denominator, right? But how about adding and subtracting fractions having different denominators? Let's see how you can make it.

Activity 1: "Part of a Whole"

A. Add the following fractions:

1. $\frac{3}{4} + \frac{2}{4} =$
2. $\frac{5}{7} + \frac{7}{8} =$
3. $2\frac{4}{9} + 3\frac{3}{8} =$
4. $5\frac{6}{7} + 4\frac{2}{7} =$
5. $4\frac{1}{8} + 5\frac{5}{8} =$

B. Subtract the following fractions:

1. $\frac{3}{5} - \frac{2}{5} =$
2. $\frac{7}{12} - \frac{5}{36} =$
3. $6\frac{1}{8} - 3\frac{5}{8} =$
4. $7\frac{3}{7} - 5\frac{3}{4} =$
5. $4\frac{2}{25} - 2\frac{1}{25} =$

What is It

Hi there! Fractions look a little like division expressions, but they aren't problems to be solved. They are a way of expressing an amount. Like numbers, fractions tell you how much you have of something. There are different kinds of fractions that you need to get acquainted with and be able to deal with utmost understanding.

Here are the different kinds of fractions and their examples. Go over it.

Similar Fractions

Similar fractions are fractions which have **the same denominator**. To add or subtract similar fractions, add or subtract the numerators and copy the common denominator. Simplify the resulting fraction, if possible.

Example 1

Add: $\frac{3}{6} + \frac{1}{6}$

$\frac{3+1}{}$ Add the numerators.

$\frac{4}{6}$ Copy the common denominator.

Answer: $\frac{\mathbf{2}}{\mathbf{3}}$ Simplify (lowest term). → $\frac{4\div 2}{6\div 2} = \frac{2}{3}$

Divide both numerator and denominator by the Greatest Common Factor.

Example 2

Subtract: $\frac{8}{15} - \frac{3}{15}$

$\frac{8-3}{}$ Subtract the numerators.

$\frac{5}{15}$ Copy the common denominator.

Answer: $\frac{\mathbf{1}}{\mathbf{3}}$ Simplify (lowest term). → $\frac{5\div 5}{15\div 5} = \frac{1}{3}$

Dissimilar Fractions

Dissimilar fractions are fractions with **different denominators**. To add or subtract dissimilar fractions, find the Least Common Denominator or LCD. Then, rewrite each fraction into its equivalent fraction using the LCD. Add or subtract the numerators and write the sum or difference over the common denominator. Simplify the resulting fraction, if possible.

Example 1

Add: $\frac{1}{4} + \frac{2}{6}$

4: 4,8,(12),16
6: 6,(12),18,24
Use the multiples of 4 and 6 to find a common denominator. The LCD of 4 and 6 is 12.

$\frac{\quad}{12} + \frac{\quad}{12}$ Determine the LCD.

$\frac{3}{12} + \frac{4}{12}$ To get the equivalent fraction, divide the LCD by the denominator and multiply the answer/quotient by the numerator.

$\frac{3+4}{12}$ Add the numerators over the common denominator.

Answer: $\frac{7}{12}$

Example 2

Subtract: $\frac{3}{5} - \frac{3}{15}$

5: 5,10,(15),20
15: (15),30,45,60

$\frac{\quad}{15} - \frac{\quad}{15}$ Determine the LCD.

$\frac{9}{15} - \frac{3}{15}$ Get the equivalent fraction.

$\frac{9-3}{15}$ Subtract the numerators over the common denominator.

$\frac{6}{15} = \frac{2}{5}$ Simplify (lowest term). → $\frac{6 \div 3}{15 \div 3} = \frac{2}{5}$

Answer: $\frac{2}{5}$

Mixed Fractions

For **mixed similar fractions**, add or subtract the whole numbers and the fractions. Simplify the resulting fraction if possible.

Example 1

Add: $4\frac{5}{10} + 2\frac{3}{10}$

$(4 + 2) + (\frac{5}{10} + \frac{3}{10})$ Add the whole numbers and the fractions.

$6 + \frac{8}{10} = 6\frac{4}{5}$ Combine and simplify.

Answer: $6\frac{4}{5}$

Example 2

Subtract: $5\frac{8}{10} - 2\frac{2}{10}$

$(5 - 2) + (\frac{8}{10} - \frac{2}{10})$ Subtract the whole numbers and the fractions.

$3\frac{6}{10}$ or $3\frac{3}{5}$ Combine and simplify.

Answer: $3\frac{3}{5}$

Example 3

Subtract: $6\frac{2}{5} - 3\frac{4}{5}$

$[5 + (\frac{5}{5} + \frac{2}{5})] - 3\frac{4}{5}$ Since we cannot subtract 4 from 2, regroup 1 or $\frac{5}{5}$ from 6.

> Any fraction with the same numerator and denominator has a value of 1. So, $\frac{5}{5}$ has a value of 1.

$5\frac{7}{5} - 3\frac{4}{5}$

$(5 - 3) + (\frac{7}{5} - \frac{4}{5})$ Subtract the whole numbers and the fractions.

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

Answer: $2\frac{3}{5}$

For **mixed dissimilar fractions**, determine the LCD of the fraction and change it to its equivalent fraction using the common denominator. Add or subtract the whole numbers and the fractions. Simplify the resulting fraction if possible.

Example Add: $4\frac{2}{3} + 5\frac{2}{6}$

$4\frac{}{6} + 5\frac{}{6}$ Determine the LCD.

> 3: 3, 6, 9, 12
> 6: 6, 12, 18, 24

$4\frac{4}{6} + 5\frac{2}{6}$ Get the equivalent fraction.

$(4+5) + \frac{4+2}{6}$ Add the whole numbers and then the fractions.

$9\frac{6}{6}$

Answer: 10

Example 1: Subtract $5\frac{3}{4} - 2\frac{2}{5}$

4: 4,8,12,16,(20)
5: 5,10,15,(20),25

$5\frac{\quad}{20} - 2\frac{\quad}{20}$ Determine the LCD.

$5\frac{15}{20} - 2\frac{8}{20}$ Get the equivalent fraction.

$(5\text{-}2) - \frac{15-8}{20}$ Subtract the whole numbers and then the fractions.

$3\frac{7}{20}$

Answer: $3\frac{7}{20}$

Example 2: Subtract $6\frac{2}{3} - 4\frac{5}{7}$

3: 3,6,9,12,15,18,(21)
7: 7,14,(21),28,35,42

$6\frac{\quad}{21} - 4\frac{\quad}{21}$ Determine the LCD.

$6\frac{14}{21} - 4\frac{15}{21}$ Get the equivalent fraction.

$[5 + (\frac{21}{21} + \frac{14}{21})] - 4\frac{15}{21}$ Since we cannot subtract 15 from 14, regroup 1 or $\frac{21}{21}$ from 6.

$5\frac{35}{21} - 4\frac{15}{21}$

$(5\text{-}4) - \frac{35-15}{21}$ Subtract the whole numbers and then the fractions.

$1\frac{20}{21}$

Answer: $1\frac{20}{21}$

CHECK

Check if the answer is correct

$$\frac{2}{4} + \frac{1}{4} + \frac{1}{4} = \frac{4}{4} \sigma 1$$

What's More

This is a complete self-check activity so we could be able to know whether or not you learned something about the lesson. So, here we go!

Activity 1. Hidden Word

Reveal the hidden word below by solving the following fractions. Write the corresponding letter in the decoder box that matches your answer. Good luck!

$2\frac{2}{3}$	$4\frac{1}{3}$	$\frac{1}{3}$	$\frac{5}{7}$	$7\frac{1}{5}$	$\frac{7}{10}$	1

A	1. $1\frac{8}{12}$ $1\frac{4}{12}$ =
Z	2. $\frac{7}{21}$ + $\frac{8}{21}$ =
M	3. $6\frac{6}{9}$ − $2\frac{3}{9}$=
G	4. $1\frac{1}{3}$ − $\frac{2}{6}$ =
A	5. $\frac{1}{3}$ + $2\frac{2}{6}$ =
N	6. $1\frac{2}{10}$ − $\frac{5}{10}$ =
I	7. $5\frac{1}{10}$ + $2\frac{1}{10}$=

What I Have Learned

This is to clarify ideas of the terms you have encountered. Understanding fractions means understanding all the possible concepts that fractions can represent. At this point, you may identify the concept/term that is referred to by the given statement.

Fill in the blanks with the correct answer. Write your answer on a separate sheet of paper.

1. _____is a part of a whole or a set.
2. _____are fractions with the same denominator.
3. _____are fractions with different denominators.
4. _____is composed of a whole number and a fraction.
5. To add or subtract dissimilar fractions, find the_____.This is the smallest number that can be divided by the denominators.
6. To simplify a fraction, divide both the top and bottom by the _____. It is the highest number that divides exactly into two or more numbers.
7. When adding and subtracting fractions, all answers must be express inthe _____if possible.
8. $\frac{3}{4} + \frac{2}{4}$ is an example of _____ fractions.
9. $\frac{5}{6} - \frac{3}{4}$ is an example of _____ fractions.
10. $4\frac{3}{7} + 5\frac{8}{9}$ is an example of _____ fractions.

What I Can Do

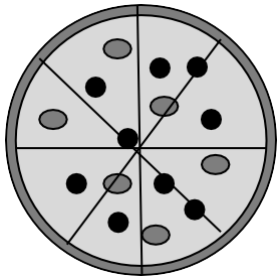
Well, understanding how fractions work, how to manipulate them, and how to perform calculations with them are skills that are useful in a surprising number of everyday situations. Here are some examples of fractions in everyday life:

1. Fractions are useful when measuring particularly the length of an object, for example, in the fraction $\frac{2}{3}$, you can use the unit fraction $\frac{1}{3}$ as the selected length and then count or measure to show that it takes two to reach $\frac{2}{3}$.

2. Working out the quantities of ingredients to feed a dinner party for 10 when you your recipe feeds 5.

Actually, you probably use fractions without even knowing it. And without fractions, you wouldn't be able to tell time or cook with recipes. Learn more and apply this lesson into your own experience. Here's you can do!

Activity 1: It's PIZZA Time!



1. A pizza is a great example of fractions! Each piece represents a part of a whole. In the picture, the pizza is divided into 8 pieces. If you have one piece, what fraction of pizza you are eating?._____

2. If your friend James has two pieces, what fraction does he have?_____

3. When Eoin gets three slices of pizza, what fraction does he get?_____

4. If you add the pizza you have eatento Eoin plus James, what is the total fraction of pizza that have been eaten?

   _____

5. When the sum of the pizza eaten by the three persons is subtracted from the whole of pizza, what fraction has left? _____

Assessment

Here's now the time to evaluate your skills and knowledge you have gained in this lesson. Please do this assessment as best as you can. Good luck!

A. Add the fractions below. Reduce your answer to lowest term.

1. $\frac{7}{18} + \frac{5}{6} =$

2. $\frac{12}{32} + \frac{18}{32} =$

3. $6\frac{4}{5} + 5\frac{3}{5} =$

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

5. $5\frac{1}{4} + \frac{2}{3} + 1\frac{2}{6} =$

B. Subtract the fractions below. Reduce your answer to lowest term.

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

2. $\frac{10}{12} - \frac{2}{12} =$

3. $\frac{18}{24} - \frac{3}{6} =$

4. $12\frac{1}{6} - 7\frac{4}{6} =$

5. $14\frac{7}{10} - 5\frac{1}{5} =$

Additional Activities

Congratulations! You have done a great job, however, you still have to do this activity to increase or maintain your enthusiasm after going through this lesson.

Add or subtract the following fractions below. Reduce your answer to lowest term.

1. $\frac{5}{6} + \frac{2}{6} =$

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

3. $5\frac{7}{24} + 12\frac{5}{6}$

4. $6\frac{5}{8} + \frac{1}{6} =$

5. $9\frac{1}{4} - \frac{5}{8} =$

6. $6\frac{4}{5} + \frac{3}{7} =$

7. $\frac{10}{4} - 1\frac{2}{5} =$

8. $\frac{9}{12} - \frac{1}{4} =$

9. $\frac{1}{4} + \frac{2}{3} + \frac{4}{6} =$

10. $4\frac{7}{8} - 1\frac{3}{8} =$

Answer Key

What I know (Pre-Test)

1. $\frac{5}{6}$
2. $6\frac{6}{11}$
3. $5\frac{11}{48}$
4. $127\frac{1}{4}$
5. $40\frac{7}{8}$
6. $1\frac{2}{3}$
7. $\frac{2}{3}$
8. $12\frac{1}{2}$
9. $\frac{1}{6}$
10. $6\frac{17}{18}$

Post-test

A. Add

1. $1\frac{2}{9}$
2. $\frac{15}{16}$
3. $12\frac{2}{5}$
4. $16\frac{19}{20}$
5. $4\frac{1}{7}$

B. Subtract

1. $\frac{2}{5}$
2. $\frac{2}{3}$
3. $\frac{1}{4}$
4. $4\frac{1}{2}$
5. $9\frac{1}{2}$

What's In

A. Find the LCD

1. 70
2. 48
3. 60

B. Find the GCF

1. 3
2. 4
3. 5

What's New

A. Add

1. $1\frac{1}{4}$
2. $1\frac{33}{56}$
3. $5\frac{59}{72}$
4. $10\frac{1}{7}$
5. $9\frac{7}{8}$

B. Subtract

1. $\frac{1}{5}$
2. $6\frac{31}{36}$
3. $2\frac{3}{8}$
4. $1\frac{19}{28}$
5. $2\frac{1}{25}$

What's More

Hidden Word

1. $A = \frac{1}{3}$
2. $Z = \frac{5}{7}$
3. $M = 4\frac{1}{3}$
4. G = 1
5. $A = 2\frac{2}{3}$
6. $N = \frac{7}{10}$
7. $I = 7\frac{1}{5}$

What I Have Learned

1. Fraction
2. Similar Fraction
3. Dissimilar Fraction
4. Mixed Fractions
5. LCD
6. GCF
7. Lowest Term
8. Similar
9. Dissimilar
10. Mixed

What I Can Do

1. $\frac{1}{8}$
2. $\frac{1}{4}$
3. $\frac{3}{8}$
4. $\frac{3}{4}$
5. $\frac{1}{4}$

Additional Activities

1. $1\frac{1}{6}$
2. $2\frac{1}{4}$
3. $18\frac{1}{8}$
4. $6\frac{19}{24}$
5. $8\frac{5}{8}$
6. $7\frac{8}{35}$
7. $1\frac{1}{10}$
8. $\frac{1}{2}$
9. $1\frac{7}{12}$
10. $3\frac{1}{2}$