

UNIT 1 NOTES
1-1 Proper and Improper Fractions and Mixed Numbers

A fraction is a number that compares part of an object or a set with whole.

Proper Fractions are fractions in which the numerator is smaller than the denominator and the 2 parts have no common factors except 1.

Improper fractions are fractions whose numerator is greater than the denominator.

Mixed Number is a whole number and a fraction.

Simplify



$\frac{3}{7} = 3$ triangles of the 7 shapes

1. $\frac{15 \div 3}{27 \div 3} = \frac{5}{9}$

2. $\frac{3}{45}$

3. $\frac{25}{30}$

4. $\frac{7}{4}$

5. $\frac{26}{8}$

6. $\frac{50}{12}$

7. $\frac{15}{6} = 2\frac{3}{6} = 2\frac{1}{2}$

8. $\frac{37}{2}$

9. $\frac{54}{7}$

1-2 The Greatest Common Factor (GCF)

Factors are 2 or more numbers which are multiplied to give you a product.

We will use factor pairs, t-charts or trees to find the GCF.

1. Take 1 number, make a chart. Start with the smallest factor and increase in order.

2. Take the second number, make a chart.

3. Find the largest factor both numbers have.

1. 42

1	42
2	21
3	14
No 4,5	
6	7

2. 64

1	64
2	32
4	16
No 5, 6, 7	
8	8

3. 42 64

2 and 21	2 and 32
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2 is the GCF

Find the GCF

1. 24 and 100

2. 30 and 96

1-3 Simplifying Fractions

If the numerator and denominator have common factors.

1. Choose the GCF

2. Divide BOTH the numerator and denominator.

3. If you do NOT use the GCF, you will divide multiple times.

Simplify

1. $\frac{36}{48}$

2. $\frac{3}{24}$

If improper change to a mixed number.

1. Divide the numerator by the denominator.

2. Write the remainder as a fraction.

3. Simplify if possible.

3. $\frac{80}{25}$

4. $\frac{75}{12}$

5. $\frac{112}{8}$

1-4 Adding and Subtracting Fractions. Whole and Mixed Numbers with Common Denominators

To add or subtract fractions you must have common denominators. Then just add or subtract the numerator and keep the denominator the same.

Remember, add fractions with fractions and whole numbers with whole numbers. If you create a whole number from your fractions, add it to the whole numbers too!

Simplify

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

2. $\frac{9}{17} + \frac{4}{17}$

3. $\frac{3}{8} + \frac{1}{8}$

4. $\frac{9}{23} - \frac{4}{23}$

5. $\frac{16}{30} - \frac{7}{30}$

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

7. $6\frac{1}{4} + 2\frac{3}{4} + 2$

9. $14\frac{9}{11} - 6\frac{7}{11}$

8. $5 + \frac{9}{11} + 6\frac{7}{11}$

10. $17\frac{5}{12} - 8\frac{1}{12}$

1-5 Subtracting with Borrowing and Regrouping

It is important to remember that a fraction whose numerator and denominator are the same is equal to 1.

Example
 $\frac{36}{36} = 1$, $\frac{5}{5} = 1$, ect..

Often we need to borrow when we subtract. What we borrow needs to be changed into a "useful" fraction.

1. $7 - \frac{5}{9}$

1. Write the problem vertically.

2. Borrow 1 whole and change into a fraction using the necessary denominator.

3. Subtract as usual.

2. $8 - 2\frac{1}{3}$

4. Simplify if possible.

3. $9 - 6\frac{6}{7}$

4. $24 - 16\frac{6}{9}$

1-6 Subtraction of Mixed Numbers and Borrowing

1. Write the problem vertically.

2. Borrow 1 whole from the whole number and change to a "useful" fraction.

3. Add the borrowed fraction to what was already there.

4. Subtract as usual

5. Simplify if possible.

Simplify

1. $7\frac{1}{3} - 4\frac{2}{3}$

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

3. $21\frac{5}{7} - 8\frac{6}{7}$

3. $11\frac{3}{8} - 8\frac{7}{8}$

1-7 Least Common Multiple LCM

To add or subtract fractions you MUST have a common denominator.

How do we find it? We use the LCM!

A multiple of any given number is any number into which it will divide exactly.

-We need a multiple that 2 or more different numbers will divide exactly.

The word multiple is a noun....multiply is a verb... but we use multiply to find multiples

Ex. Find the LCM of 2,5, and 15.

1. Always start with the largest number.

$$15 * 1 = 15$$

$$* 2 = 30$$

$$* 3 = 45$$

be thinking ... can 2 and 5 go into any of these

Find the LCM:

1. 4 and 6

2. 5 and 7

3. 6 and 9

2. $5 * 1 = 5$
 $* 2 = 10$
 $* 3 = 15$
 $* 4 = 20$
 $* 5 = 25$
 $* 6 = 30$

15 and 30 are common but which one does 2 go into exactly?

30 is the LCM

Least Common Multiple(LCM)
Is also called the Least Common Denominator(LCD)

We want the denominators to be the same before we can subtract!

Sometimes the LCD or LCM is the product of 2 denominators

i.e

$$5 * 7 = 35$$

4. 10 and 15

5. 13 and 20

Try This

6. 12 and 16

7. 8 and 20

1-8 Adding and Subtracting Fractions With Unlike Denominators

Steps to Adding and Subtracting with unlike denominators.	Simplify
1. Line up the fractions vertically.	1. $\frac{5}{6} + \frac{2}{3}$
2. Find the LCM or LCD.	
3. Multiply BOTH the numerator and denominator to make the LCD or common denominators.	2. $\frac{5}{8} + \frac{5}{6}$
4. Add or subtract the numerators.	
5. Borrow if you need for subtraction.	
6. Simplify your answer or reduce.	3. $\frac{2}{3} + \frac{3}{4}$
	4. $5\frac{1}{3} + 10\frac{5}{6}$
	5. $\frac{7}{8} - \frac{1}{4}$

6. $\frac{11}{12} - \frac{5}{8}$

Try it

1. $\frac{5}{6} + \frac{4}{9}$

7. $5\frac{1}{4} - \frac{4}{12}$

2. $\frac{7}{10} - \frac{3}{8}$

8. $8\frac{8}{15} - 1\frac{3}{5}$

3. $14\frac{1}{6} - 6\frac{4}{5}$

1-9 Comparing Fractions with Uncommon Denominators

NOTHING can be done unless your denominators are the same.

1. Find the LCD
2. Set up equivalent fractions
3. Compare
4. Return to original form

Compare $\frac{6}{11}$ and $\frac{2}{3}$

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

To add or subtract, you MUST have a common denominator.

1. Find the LCD
2. Set up equivalent fractions
3. Add or Subtract
4. Simplify your answer if possible

2. $\frac{5}{9}$ and $\frac{2}{15}$

3. $\frac{5}{7} - \frac{1}{3}$

4. $\frac{3}{8} + \frac{7}{12}$

1-10 Find Equivalent Fractions

Because we need common denominators to add or subtract and we have found the LCD or LCM...
Now what?

1. We must create equivalent fractions-
2 fractions that "look different but represent the exact same amount.

2. To find equivalent fractions you need to know what the numerator or denominator was multiplied by. Then do the same to the unknown value.

Example

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

2. $\frac{2}{8} = \frac{8}{x}$

3. $\frac{5}{6} = \frac{x}{54}$

1-11 Subtracting Mixed Numbers with Uncommon Denominators

The steps are the same, but don't forget the whole numbers!

1. Find the LCD
2. Set up equivalent fractions
3. Add or Subtract
4. Simplify your answer if possible

Simplify

1. $27\frac{1}{6} - 25\frac{1}{8}$

2. $19\frac{4}{5} - 11\frac{1}{15}$

3. $33\frac{4}{7} - 21\frac{1}{3}$

1-12 Subtract Mixed Numbers with Uncommon Denominators and Borrowing

This has many steps must keep organized.

1. Vertical set up.
2. Find LCM.
3. Equivalent Fractions
4. Borrow 1 whole and change into LCD.
5. Add Borrowed Fraction.
6. Subtract.
7. Simplify.

Simplify

1. $20\frac{1}{3} - 8\frac{5}{9}$

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

3. $9\frac{2}{5} - 2\frac{2}{3}$

4. $19\frac{7}{10} - 15\frac{1}{3}$

1-13 Multiplying Fractions

There are 2 simple rules.

1. Multiply numerators by numerators.
2. Multiply denominator by denominator.

Any whole number can be changes into a fraction by placing the number in the numerator and a 1 in the denominator.

Simplify

1. $\frac{3}{8} \cdot \frac{4}{9}$

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

3. $\frac{6}{11} \cdot \frac{1}{2}$

4. $17 \cdot \frac{1}{8}$

5. $\frac{5}{9} \cdot 3$

6. $8 \cdot \frac{5}{12}$

1-14 Division of Fractions

Reciprocal: Is the fraction "flipped" upside down.

The real definition is the fraction when multiplied by the original, equals 1.

We need to know reciprocals to divide.

Rules

1. write the problem
- 2 Rewrite the 1st fraction exactly
3. Change \div to \cdot
4. Use the reciprocal of the 2nd fraction
5. Multiply across

"Copy Dot Flip"

Examples

$$\frac{2}{3} \cdot \frac{3}{2} = 1$$

1. $\frac{4}{5} \div \frac{1}{2}$

2. $\frac{3}{24} \div \frac{9}{6}$

3. $\frac{8}{25} \div 2$

$$4. \frac{7}{12} \div \frac{14}{15}$$

$$5. \frac{9}{10} \div \frac{6}{7}$$

What if there are whole or mixed numbers?

Just like multiplication every number must be in fraction form **BEFORE** you start the process.

$$\text{Ex. } 5\frac{8}{9} \div 1\frac{1}{3}$$

$$6. 6\frac{1}{3} \div \frac{3}{4}$$

$$7. 20\frac{1}{2} \div 2\frac{11}{16}$$