Important Concepts . . .

# Preview Review

## Mathematics Grade 7 TEACHER KEY

## W1 - Lesson 3: Fractions and Mixed Numbers

## Important Concepts of Grade 7 Mathematics



## Materials Required

Math Set
Calculator

**No Textbook Required**

**This is a stand-alone course.**


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# Preview/Review Concepts for Grade Seven Mathematics

## Teacher Key

*W1 – Lesson 3:*

*Fractions and Mixed Numbers*

## Introductory Information for Teachers

Preview/Review courses are aimed mainly at students who have completed the regular course but who need to review some of the material before beginning the next grade. Other students may find Preview/Review courses useful in preparing for the new concepts they will study in their next grade.

No Preview/Review course is intended to replace the regular course because each covers only what the writers have decided are the top 15 concepts from the Program of Studies for that course.

Preview/Review materials are intended for use by teachers and students in one-subject and one-grade classrooms. This Preview/Review course contains fifteen lessons in three sections. Each section has five lessons. A short quiz is provided at the end of each section to test student knowledge of the material studied. In a classroom the course will likely be completed in three weeks.

This Preview/Review course is written to be stand-alone. There is no textbook required.

# W1 – Lesson 3: Fractions

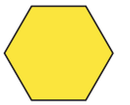
## Warm-up:

- *I can use pattern blocks to model fractions.*

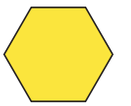
## Fraction Tiles

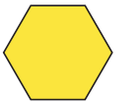
How many?

1.  are in  ? ___2___

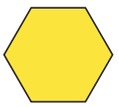
2.  are in  ? ___6___

3.  are in  ? ___3___

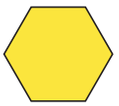
4.  are in  ? ___3___

5.  are in  ? ___2___

Based on the relationships above,

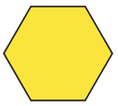
1. If  = 1.  = ___1/6___

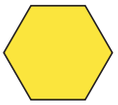
2. If  = 1.  = ___1/3___

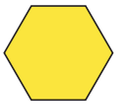
3. If  = 1. =  ___1/2___

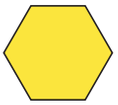
4. If  = 1. =  ___2/3___

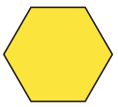
Now, try some really fun shapes.

1. If  +  = 1, what is  ? ***1/9***

2. If  +  = 1, what is  +  ? ***2/8 = 1/4***

3. If  +  = 1, what is  +  ? ***4***

4. If  +  = 1, what is  ? ***3/7***

5. If  -  = 1, what is  +  ? ***1***

## Review:

- *I understand fraction basics.*

## Practice

**vinculum** → $\frac{3 \longrightarrow \text{numerator or dividend}}{7 \longrightarrow \text{denominator or divisor}}$

**proper fraction:** a fraction in which the numerator is **less than** the denominator

Example: $\frac{2}{3}$

**improper fraction:** a fraction in which the numerator is **greater than** the denominator

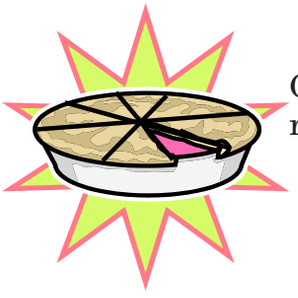
Example: $\frac{7}{2}$

**mixed number:** the sum of a whole number and a proper fraction

**Example:** $4\frac{6}{7}$

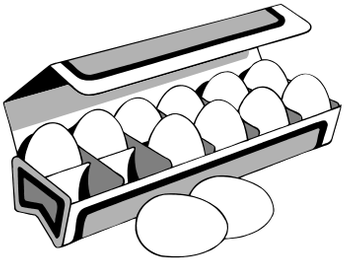
**vinculum:** the line between the numerator and the denominator, showing that the two numbers are connected

**Example 1:** What fraction of the pie has been removed?



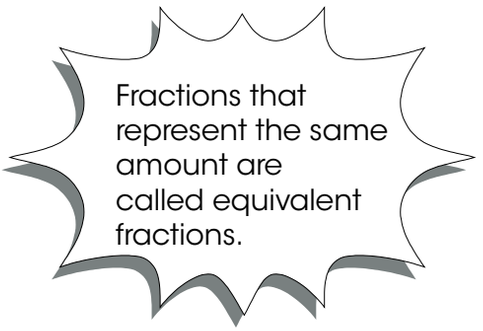
One of eight pieces has been removed; therefore, $\frac{1}{8}$ has been removed.

**Example 2:** What fraction of the eggs is left in the carton?



Ten of twelve eggs are still in the carton; therefore $\frac{\boldsymbol{10}}{\boldsymbol{12}}$ or $\frac{5}{6}$ is left in the carton.

# Equivalent Fractions




**Example:** Write three equivalent fractions for $\frac{2}{3}$.

$$\frac{2}{3} \overset{\times 2}{=} \frac{4}{6} \qquad \frac{2}{3} \overset{\times 3}{=} \frac{6}{9} \qquad \frac{2}{3} \overset{\times 4}{=} \frac{8}{12}$$

$\frac{4}{6}$, $\frac{6}{9}$, and $\frac{8}{12}$ are all equivalent fractions of $\frac{2}{3}$.

Multiplying or dividing the numerator **and** denominator by the **same number** can generate an unlimited number of equivalent fractions.

# Practice

Fill in the blanks to complete the equivalent fractions.

a. $\frac{2}{3} = \frac{\boldsymbol{10}}{15}$

b. $\frac{1}{7} = \frac{\boldsymbol{3}}{21}$

c. $\frac{4}{8} = \frac{1}{\boldsymbol{2}}$

d. $\frac{5}{12} = \frac{10}{\boldsymbol{24}}$

e. $\frac{7}{11} = \frac{\boldsymbol{21}}{33}$

f. $\frac{6}{18} = \frac{\boldsymbol{3}}{9}$

g. $\frac{8}{20} = \frac{\boldsymbol{2}}{5}$

h. $\frac{33}{99} = \frac{1}{\boldsymbol{3}}$

i. $\frac{2}{\boldsymbol{5}} = \frac{4}{10}$

j. $\frac{3}{\boldsymbol{4}} = \frac{21}{28}$

# Reducing Fractions to Simplest Form

A fraction in simplest form is the fraction that cannot be divided to find an equivalent fraction.

**Example:** Write the fractions in lowest terms.

a. $\frac{9}{12} = \frac{3}{4}$ ($\div 3$ above and below)

9 and 12 are both divisible by 3.

The simplest form of $\frac{9}{12}$ is $\frac{3}{4}$.

b. $\frac{7}{12}$

Because 7 and 12 do not have any numbers by which they are **both** divisible, the fraction is already in its simplest form.

A fraction in **simplest form** is also known as a **reduced fraction** or a fraction expressed in **lowest terms.**

Answers should always be given in **lowest terms.**

## Practice

Express each fraction in lowest terms.

a. $\frac{2}{4} = \frac{\boldsymbol{1}}{\boldsymbol{2}}$

b. $\frac{4}{12} = \frac{\boldsymbol{1}}{\boldsymbol{3}}$

c. $\frac{6}{9} = \frac{\boldsymbol{2}}{\boldsymbol{3}}$

d. $\frac{5}{15} = \frac{\boldsymbol{1}}{\boldsymbol{3}}$

e. $\frac{7}{21} = \frac{\boldsymbol{1}}{\boldsymbol{3}}$

f. $\frac{10}{18} = \frac{\boldsymbol{5}}{\boldsymbol{9}}$

g. $\frac{8}{24} = \frac{\boldsymbol{1}}{\boldsymbol{3}}$

h. $\frac{50}{100} = \frac{\boldsymbol{1}}{\boldsymbol{2}}$

i. $\frac{3}{12} = \frac{\boldsymbol{1}}{\boldsymbol{4}}$

j. $\frac{5}{25} = \frac{\boldsymbol{1}}{\boldsymbol{5}}$

## Objective:

- *I can add and subtract fractions with the same denominators..*

Adding fractions with the same denominator

Keep the denominator the same; add the numerators.

**Example**: $\frac{1}{4}+\frac{2}{4}=$

$1+2=3$ Therefore, $\frac{1}{4}+\frac{2}{4}=\frac{3}{4}$

Subtracting fractions with the same denominator.

Keep the denominator the same; subtract the numerators.

**Example**: $\frac{7}{12}-\frac{3}{12}=$

$7-3=4$ Therefore, $\frac{7}{12}-\frac{3}{12}=\frac{4}{12}$

## Practice

Solve. Express your answers in lowest terms..

a. $\frac{1}{3}+\frac{1}{3}=$ ***2/3***

b. $\frac{1}{7}+\frac{5}{7}=$ ***6/7***

c. $\frac{2}{9}+\frac{4}{9}=$ ***6/9*** = ***2/3***

d. $\frac{5}{10}+\frac{3}{10}=$ ***8/10*** = ***4/5***

e. $\frac{1}{6}+\frac{3}{6}=$ ***4/6*** = ***2/3***

f. $\frac{11}{20}+\frac{5}{20}=$ ***16/20*** = ***4/5***

g. $\frac{3}{8}+\frac{2}{8}=$ ***5/8***

h. $\frac{10}{12}-\frac{8}{12}=$ ***2/12*** = ***1/6***

i. $\frac{17}{21}-\frac{8}{21}=$ ***9/21*** = ***3/7***

j. $\frac{13}{15}-\frac{3}{15}=$ ***10/15*** = ***2/3***

k. $\frac{9}{10}-\frac{5}{10}=$ ***4/10*** = ***2/5***

l. $\frac{7}{9}-\frac{2}{9}=$ ***5/9***

## Objective:

- *I can add and subtract fractions with the different denominators..*

**Example 1:** $\frac{7}{8}-\frac{2}{10}=$

You need a common denominator.
8 and 10 are both factors of 40.

Change: $\frac{7}{8} \longrightarrow \frac{35}{40}$

Change: $\frac{2}{10} \longrightarrow \frac{8}{40}$

Subtract: $\frac{35}{40}-\frac{8}{40}=\frac{27}{40}$

**Example 2:** $\frac{1}{4}+\frac{3}{12}=$

Common denominator: 12

Change: $\frac{1}{4} \longrightarrow \frac{3}{12}=$

Add: $\frac{3}{12}+\frac{3}{12}=\frac{6}{12}=\frac{1}{2}$

Or
Common denominator: 4

Change: $\frac{3}{12} \longrightarrow \frac{1}{4}$

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

## Practice

Solve. Express your answers in lowest terms..

a. $\frac{2}{3}+\frac{1}{7}=\frac{14}{21}+\frac{3}{21}=\frac{17}{21}$

b. $\frac{1}{6}+\frac{3}{4}=\frac{2}{12}+\frac{9}{12}=\frac{11}{12}$

c. $\frac{1}{2}+\frac{4}{9}=\frac{9}{18}+\frac{8}{18}=\frac{17}{18}$

d. $\frac{6}{10}+\frac{3}{8}=\frac{24}{40}+\frac{15}{40}=\frac{39}{40}$

e. $\frac{5}{20}+\frac{5}{8}=\frac{10}{40}+\frac{25}{40}=\frac{35}{40}=\frac{7}{8}$

f. $\frac{3}{21}+\frac{2}{3}=\frac{3}{21}+\frac{14}{21}=\frac{17}{21}$

g. $\frac{10}{12}-\frac{1}{4}=\frac{10}{12}-\frac{3}{12}=\frac{7}{12}$

h. $\frac{17}{21}-\frac{5}{7}=\frac{17}{21}-\frac{15}{21}=\frac{2}{21}$

i. $\frac{9}{10}-\frac{3}{20}=\frac{18}{20}-\frac{3}{20}=\frac{15}{20}=\frac{3}{4}$

j. $\frac{7}{9}-\frac{1}{3}=\frac{7}{9}-\frac{3}{9}=\frac{4}{9}$

## Objective:

- *I can model the addition and subtraction of fractions.*

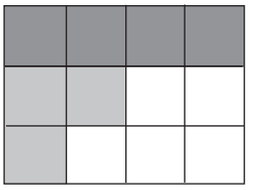
## Grid Model

Note: Use the columns and rows of a grid to represent different denominators.

**Example 1:** $\frac{1}{3}+\frac{1}{4}=$

1 of 3 rows = $\frac{1}{4}$

colour in 4 squares



Total squares = 12

Number of shaded squares = 7

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

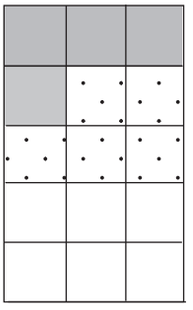
1 of 4 columns = $\frac{1}{3}$

colour in 3 squares

**Example 2:** $\frac{3}{5}-\frac{1}{3}=$

3 of 5 rows = $\frac{3}{5}$

colour in 9 squares



Total squares = 14

Number of shaded squares left = 4

Answer = $\frac{4}{15}$

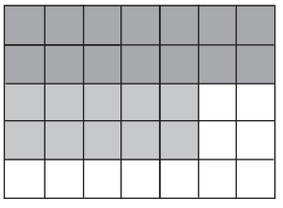
1 of 3 columns = $\frac{1}{3}$

erase 5 squares

## Practice

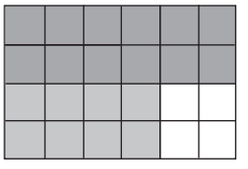
Draw the grid that represents best the solution. For this activity you do not need to simplify the fraction.

a. $\frac{1}{3}+\frac{1}{3}=\frac{24}{35}$



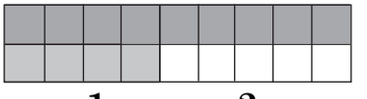
$\square = \frac{2}{7}$ $\square = \frac{2}{5}$

b. $\frac{1}{7}+\frac{5}{7}=\frac{20}{24}$



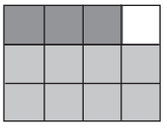
$\square = \frac{2}{4}$ $\square = \frac{2}{6}$

c. $\frac{2}{9}+\frac{4}{9}=\frac{13}{18}$



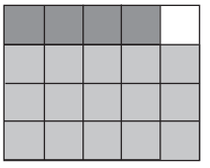
$\square = \frac{1}{2}$ $\square = \frac{2}{6}$

d. $\frac{1}{4}+\frac{2}{3}=\frac{11}{12}$



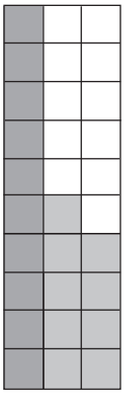
$\square=\frac{1}{4}$ $\square=\frac{2}{3}$

e. $\frac{1}{5}+\frac{3}{4}=\frac{19}{20}$



$\square=\frac{1}{5}$ $\square=\frac{3}{4}$

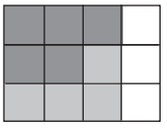
f. $\frac{1}{3}+\frac{3}{10}=\frac{19}{30}$



$\square=\frac{1}{3}$

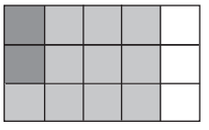
$\square=\frac{3}{10}$

g. $\frac{3}{4}-\frac{1}{3}=\frac{5}{12}$



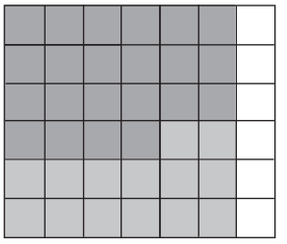
$\square=\frac{1}{3}\left(\frac{4}{12}\right)$ $\square=\frac{5}{12}$

h. $\frac{4}{5}-\frac{2}{3}=\frac{2}{15}$



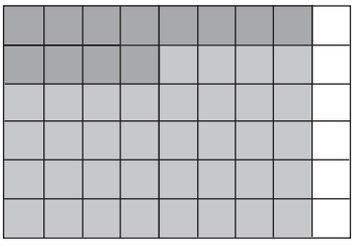
$\square=\frac{2}{3}\left(\frac{10}{15}\right)$ $\square=\frac{2}{15}$

i. $\frac{6}{7}-\frac{2}{6}=\frac{22}{42}$



$\square=\frac{2}{6}\left(\frac{14}{42}\right)$ $\square=\frac{22}{42}$

j. $\frac{8}{9}-\frac{4}{6}=\frac{12}{54}$

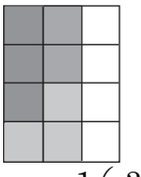


$\square=\frac{4}{6}\left(\frac{36}{54}\right)$ $\square=\frac{12}{54}$

k. $\frac{7}{8}-\frac{1}{2}=\frac{6}{16}$

$\square=\frac{1}{2}\left(\frac{8}{16}\right)$ $\square=\frac{6}{16}$

l. $\frac{2}{3}-\frac{1}{4}=\frac{5}{12}$



$\square=\frac{1}{4}\left(\frac{3}{12}\right)$ $\square=\frac{5}{15}$

## Summary and Practice:

- *Using what you learned answer the following questions.*

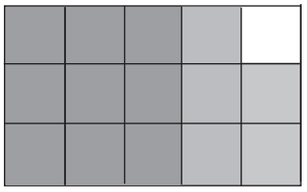
1. On the chart below, summarize the steps needed to add or subtract fractions with the same denominator and fractions with different denominators.

| | Same Denominators | Different Denominators |
|---|---|---|
| **Steps to add fractions** | *Answers may vary*<br>*Example:*<br>1. *Keep the denominator the same.*<br>2. *Add the numerators, then reduce if possible.* | *Answers may vary*<br>*Example:*<br>1. *Find a common denominator.*<br>2. *Change the fractions to an equivalent fraction with the new denominator.*<br>3. *Add the new numerators, then reduce if possible* |
| **Steps to subtract fractions** | *Answers may vary*<br>*Example:*<br>1. *Keep the denominator the same.*<br>2. *subtract the numerators, then reduce if possible.* | *Answers may vary*<br>*Example:*<br>1. *Find a common denominator.*<br>2. *Change the fractions to an equivalent fraction with the new denominator.*<br>3. *Subtract the new numerators, then reduce if possible* |

2. Express the fractions in lowest terms.

a. $\frac{6}{18} = \frac{2}{9}$ b. $\frac{9}{54} = \frac{1}{6}$ c. $\frac{16}{48} = \frac{1}{3}$ d. $\frac{14}{21} = \frac{2}{7}$

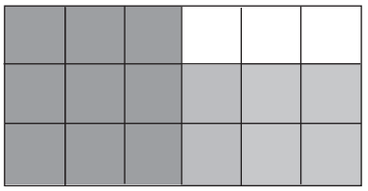
3. Using the grid below, write an addition equation represented by the grid.



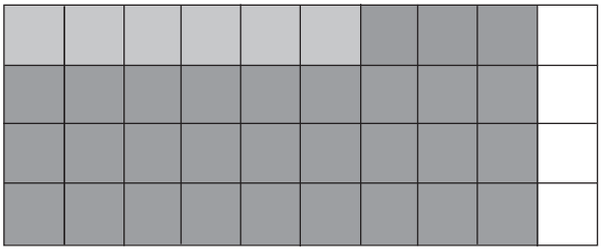
$\frac{3}{5} + \frac{1}{3} = \frac{14}{15}$

4. Model using a grid.

a. $\frac{3}{6}+\frac{1}{3}=\frac{15}{18}$



b. $\frac{9}{10}-\frac{3}{4}=\frac{6}{40}=\frac{3}{20}$



5. $\frac{1}{3}$ of entries in a pet show are cats. $\frac{1}{2}$ of the entries are dogs.

What fraction of the animals is not a cat or a dog?

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

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

$\frac{1}{6}$ of the animals is not a cat or a dog.

6. George spent $\frac{2}{8}$ of his spare time playing video games, $\frac{2}{6}$ practising basketball, $\frac{1}{4}$ practising guitar, and the remainder watching TV. What fraction represents the time he spent watching TV?

$\frac{2}{8}+\frac{2}{6}+\frac{1}{4}=\frac{6}{24}+\frac{8}{24}+\frac{6}{24}=\frac{20}{24}=\frac{5}{6}$

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

George spent $\frac{1}{6}$ of his time watching TV.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