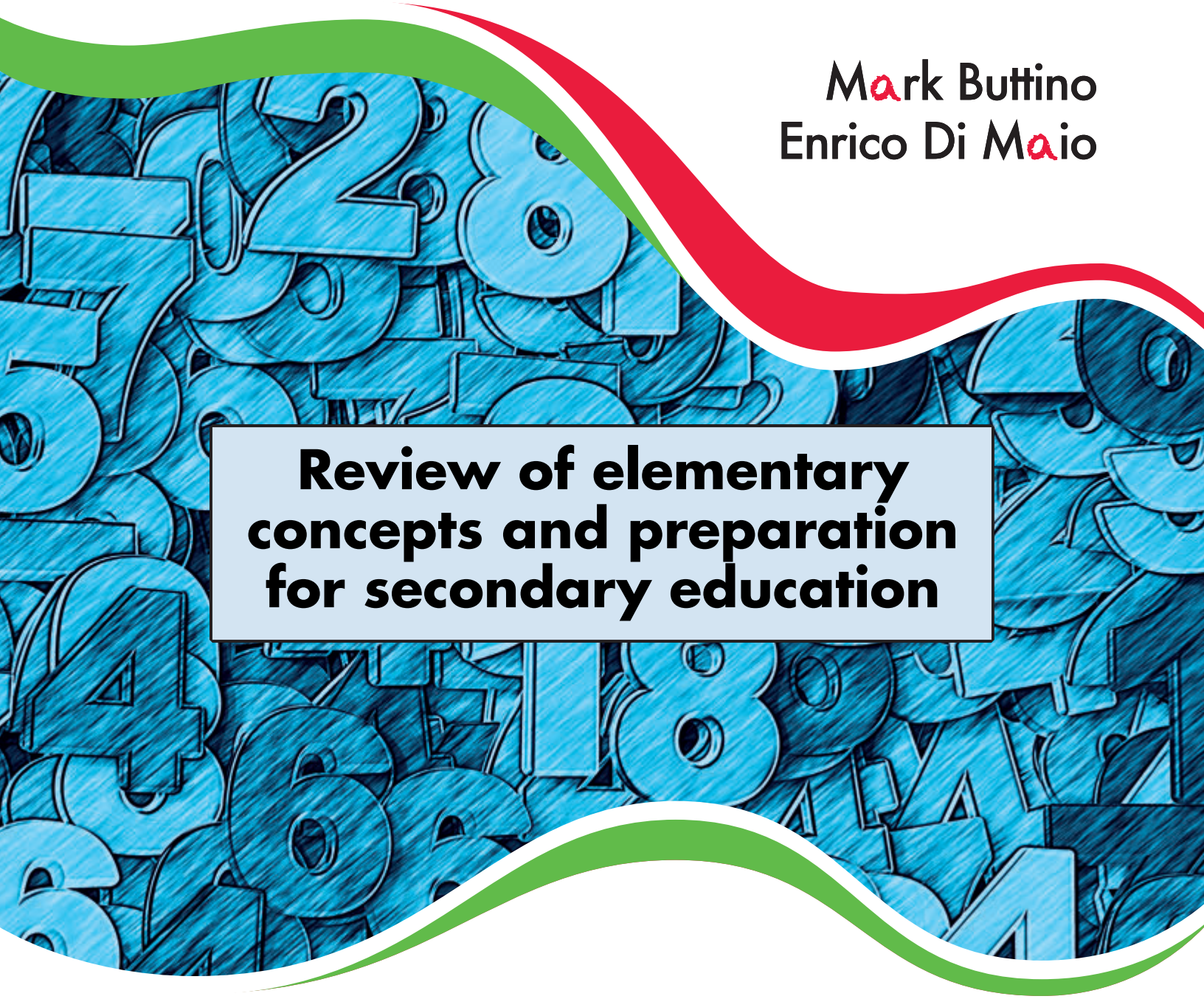
SUCCESS IN MATHEMATICS

Mark Buttino
Enrico Di Maio



Review of elementary concepts and preparation for secondary education

Guérin

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Message to Parents and Guardians

This workbook has been designed to allow your child to be best prepared for high school Mathematics. This book covers the most important and relevant topics that are necessary for success.

From basic math fundamentals to more advanced topics, this book allows your child to learn, review and practice. Whether using this as a supplemental book during the year or as a summer preparatory review, your child will master these important topics.

Designed by math teachers with decades of experience, this book aims to transmit their knowledge, tricks and tips on a variety of topics in a concise and direct manner.



WHY WE WROTE THIS BOOK

- Over the years we have noticed that students enter high school at different levels mathematically. This book was created:
- To allow students to get a head start, by ensuring they acquire the proper knowledge on important topics while introducing them to topics they will encounter;
- To ensure student success by creating a less stressful experience as a result of being well prepared.

AIM OF THIS BOOK

- To provide parents/guardians with peace of mind knowing their child will be prepared for high school math
- To offer a direct, step by step instructional book that is easy to use and understand, therefore allowing your child to learn quickly and easily
- To ensure all students entering high school are at a level that will help them achieve success with much less stress

WHAT MAKES THIS BOOK SPECIAL?

- Designed to be student-centered
- Easy to use; students can learn and work independently
- Clear definitions, explanations and teaching instructions
- Many step-by-step examples
- Tricks, tips and reminders for each topic
- Lots of practice with solutions
- Targets important topics

8 FRACTIONS

› There are three types of fractions: proper, mixed and improper fractions.

EXAMPLES

$\frac{2}{3}$ **Proper fraction: the numerator is smaller than the denominator.**

$3\frac{5}{7}$ **Mixed fraction: a whole number + a proper fraction.**

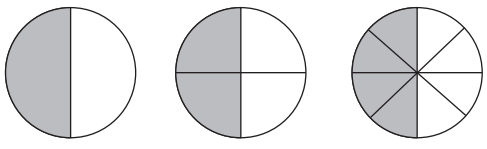
$\frac{37}{4}$ **Improper fraction: the numerator is larger than the denominator.**

› We can convert an improper fraction to a mixed fraction and vice versa.

EQUIVALENT FRACTIONS

› Two fractions $\frac{a}{b}$ and $\frac{c}{d}$ are equivalent if they represent the same number.

› The fractions may look different, but they are always equivalent, whether they are reduced or not: $\frac{4}{6} = \frac{2}{3}$.



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

› To find equivalent fractions, we multiply or divide the numerator and denominator by the same number.

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EXAMPLES

$\frac{2}{3}=\frac{14}{21} \rightarrow \frac{2\times 7}{3\times 7}=\frac{14}{21}$ $\qquad$ $\frac{18}{24}=\frac{3}{4} \rightarrow \frac{18\div 6}{24\div 6}=\frac{3}{4}$



PRACTICE 1

Find the equivalent fractions.

1. $\frac{3}{4}=\frac{9}{12}$
2. $\frac{6}{8}=\frac{3}{\square}$
3. $\frac{1}{2}=\frac{\square}{12}$
4. $\frac{15}{25}=\frac{\square}{5}$
5. $\frac{37}{50}=\frac{\square}{100}$
6. $\frac{28}{48}=\frac{7}{\square}$
7. $\frac{1}{6}=\frac{\square}{12}$
8. $\frac{\square}{75}=\frac{4}{5}$
9. $\frac{24}{66}=\frac{\square}{11}$
10. $\frac{\square}{4}=\frac{3}{12}$
11. $\frac{72}{96}=\frac{9}{\square}$
12. $\frac{\square}{12}=\frac{108}{144}$
13. $\frac{7}{9}=\frac{42}{\square}$
14. $\frac{18}{27}=\frac{\square}{9}$
15. $\frac{32}{64}=\frac{16}{\square}$
16. $\frac{12}{22}=\frac{\square}{11}$
17. $\frac{12}{16}=\frac{\square}{4}$
18. $\frac{9}{11}=\frac{\square}{22}$
19. $\frac{15}{\square}=\frac{3}{5}$
20. $\frac{\square}{36}=\frac{8}{9}$
21. $\frac{40}{48}=\frac{5}{\square}$
22. $\frac{18}{30}=\frac{6}{\square}$
23. $\frac{120}{225}=\frac{8}{\square}$
24. $\frac{81}{117}=\frac{\square}{13}$

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8.1 Reducible Fractions

› A fraction is reducible when the numerator and the denominator have a common factor.

› We divide the numerator and the denominator by a common factor until it is reduced.

$$\frac{30}{60}\overset{\div 2}{=}\frac{15}{30}\overset{\div 3}{=}\frac{5}{10}\overset{\div 5}{=}\frac{1}{2}$$

› We can use the GCF to reduce faster:
(**GCF:** The **G**reatest **C**ommon **F**actor is the largest factor common to two numbers or more.)

EXAMPLES

$\frac{6}{8}\overset{\div 2}{=}\frac{3}{4}$ $\quad\frac{20}{40}\overset{\div 20}{=}\frac{1}{2}$ $\quad\frac{10}{5}\overset{\div 5}{=}\frac{2}{1}$ $\quad\frac{18}{27}\overset{\div 9}{=}\frac{2}{3}$

PRACTICE 2

Reduce the following fractions.

1. $\frac{2}{4}=\frac{1}{2}$
2. $\frac{5}{40}=$
3. $\frac{3}{12}=$
4. $\frac{24}{36}=$
5. $\frac{16}{48}=$
6. $\frac{20}{60}=$
7. $\frac{15}{85}=$
8. $\frac{72}{81}=$
9. $\frac{48}{72}=$
10. $\frac{120}{144}=$
11. $\frac{35}{45}=$
12. $\frac{48}{56}=$
13. $\frac{60}{95}=$
14. $\frac{44}{64}=$
15. $\frac{140}{200}=$
16. $\frac{80}{20}=$
17. $\frac{120}{150}=$
18. $\frac{70}{75}=$
19. $\frac{64}{72}=$
20. $\frac{55}{77}=$

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8.2 Converting Fractions

› We can convert a fraction from one type (form) to another.

Improper to mixed fraction

› When the numerator is larger than the denominator, we change the fraction into mixed form.

› The result is composed of a whole part and a remainder.

METHOD

Step 1: Divide the numerator by the denominator.

Step 2: Write the remainder and keep the same denominator.

Step 3: Reduce the fractional part if necessary.

$$\frac{9}{8}=1\frac{1}{8} \qquad \frac{16}{7}=2\frac{2}{7} \qquad \frac{20}{6}=3\frac{2}{6}=3\frac{1}{3}$$

PRACTICE 3

Convert the following improper fractions to mixed fractions. Reduce if necessary.

1. $\frac{15}{4}=3\frac{3}{4}$
2. $\frac{13}{2}=$
3. $\frac{17}{5}=$
4. $\frac{27}{4}=$
5. $\frac{23}{3}=$
6. $\frac{13}{11}=$
7. $\frac{63}{8}=$
8. $\frac{123}{15}=$
9. $\frac{103}{12}=$
10. $\frac{137}{32}=$
11. $\frac{25}{6}=$
12. $\frac{40}{12}=$
13. $\frac{30}{4}=$
14. $\frac{16}{6}=$
15. $\frac{75}{20}=$
16. $\frac{30}{6}=$
17. $\frac{32}{7}=$
18. $\frac{40}{6}=$
19. $\frac{54}{10}=$
20. $\frac{70}{18}=$

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Mixed to improper fraction

› We multiply the denominator by the whole number, then we add the numerator from the fractional part and we write the result above the denominator:

$$\frac{\textbf{(denominator} \times \textbf{whole number} + \textbf{numerator)}}{\textbf{denominator}}$$

$$2\frac{2}{5} = \frac{(5\times 2+2)}{5} = \frac{12}{5} \qquad 1\frac{2}{3} = \frac{(3\times 1+2)}{3} = \frac{5}{3}$$

PRACTICE 4

Convert the following mixed fractions to improper fractions. Reduce if necessary.

❶ $3\frac{1}{4} = \frac{13}{4}$ ❷ $5\frac{3}{7} =$ ❸ $2\frac{3}{8} =$ ❹ $5\frac{2}{3} =$ ❺ $7\frac{2}{3} =$

❻ $20\frac{3}{4} =$ ❼ $4\frac{3}{14} =$ ❽ $12\frac{2}{5} =$ ❾ $9\frac{2}{7} =$ ❿ $6\frac{9}{10} =$

⓫ $4\frac{1}{7} =$ ⓬ $6\frac{2}{5} =$ ⓭ $9\frac{1}{6} =$ ⓮ $8\frac{3}{4} =$ ⓯ $15\frac{5}{8} =$

⓰ $5\frac{3}{7} =$ ⓱ $4\frac{2}{9} =$ ⓲ $8\frac{1}{2} =$ ⓳ $10\frac{2}{7} =$ ⓴ $12\frac{7}{8} =$

8.3 Addition and Subtraction of Fractions

› **Adding** and **subtracting** fractions with **LIKE** denominators:

Proper Fractions	Mixed Fractions	Improper Fractions
$\frac{2}{7}+\frac{3}{7}=\frac{2+3}{7}=\frac{5}{7}$	$6\frac{2}{5}-2\frac{1}{5}=\begin{matrix}6-2=4\\ \frac{2}{5}-\frac{1}{5}=\frac{1}{5}\end{matrix}=4\frac{1}{5}$	$\frac{13}{3}+\frac{25}{3}=\frac{13+25}{3}=\frac{38}{3}=12\frac{2}{3}$
We add or subtract numerators and we keep the same denominator.	We add or subtract the whole part and we repeat the process with the fractional part.	We add or subtract numerators and we keep the same denominator. We then convert to a mixed fraction.

PRACTICE 5

Add or subtract fractions with like denominators. Reduce if necessary.

1. $\frac{2}{5}+\frac{1}{5}=$ $\frac{3}{5}$
2. $\frac{2}{3}+\frac{1}{3}=$
3. $\frac{3}{7}+\frac{2}{7}=$
4. $\frac{4}{9}+\frac{2}{9}=$
5. $\frac{12}{25}+\frac{11}{25}=$
6. $\frac{6}{13}+\frac{2}{13}=$
7. $\frac{2}{5}-\frac{1}{5}=$
8. $\frac{6}{7}-\frac{3}{7}=$
9. $\frac{11}{23}-\frac{4}{23}=$
10. $\frac{13}{73}-\frac{10}{73}=$



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› **Adding** and **subtracting** fractions with **UNLIKE** denominators:

› Fractions can only be added or subtracted if there is a common denominator.

› It is necessary to find equivalent fractions to simplify mathematical expressions.

TRICKS

When denominators are unlike, we use the LCM.
(The **LCM** is the **L**east **C**ommon **M**ultiple. It is the smallest multiple common to two numbers or more.)

We find equivalent fractions with which we can add and subtract fractions.

1. PROPER FRACTIONS

$$\frac{2}{3}+\frac{4}{5}$$

Step 1: Find the LCM of the denominators.

LCM:

3: 3, 6, 9, 12, ***15***, 18

5: 5, 10, ***15***, 20

Step 2: Ask yourself:
By what number is the denominator multiplied to obtain the LCM?

$3\times\mathbf{5}=\mathbf{15}$

$5\times\mathbf{3}=\mathbf{15}$

Step 3: Find equivalent fractions with the same denominator.

$$\frac{2}{3}\overset{\times 5}{}+\frac{4}{5}\overset{\times 3}{}=\frac{10}{15}+\frac{12}{15}=\frac{22}{15}$$

Step 4: Reduce if necessary.

$$\frac{22}{15}=1\frac{7}{15}$$

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EXAMPLE

$$\frac{3}{4}-\frac{2}{5}=\frac{15}{20}-\frac{8}{20}=\frac{7}{20}$$

LCM (4, 5) = 20

2. MIXED FRACTIONS AND IMPROPER FRACTIONS

Step 1: Convert mixed fraction to an improper fraction.

Step 2: Find the least common multiple (LCM).

Step 3: Convert to a mixed fraction.

EXAMPLE

$$3\frac{1}{4}+2\frac{1}{3}$$

$$3\frac{1}{4}=\frac{13}{4}$$
$$2\frac{1}{3}=\frac{7}{3}$$

$$\frac{13}{4}+\frac{7}{3}=\frac{39}{12}+\frac{28}{12}=\frac{67}{12}=5\frac{7}{12}$$

PRACTICE 6

Add and subtract fractions with unlike denominators.
Reduce if necessary.

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

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

3. $\frac{1}{4}+\frac{1}{3}=$

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4. $\frac{5}{7}+\frac{1}{3}=$

5. $\frac{2}{7}+\frac{1}{6}=$

6. $\frac{2}{3}+\frac{1}{8}=$

7. $\frac{3}{5}-\frac{1}{15}=$

8. $\frac{3}{4}-\frac{1}{16}=$

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

10. $\frac{7}{10}-\frac{3}{5}=$

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

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

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⓭ $\frac{13}{6}+\frac{11}{6}=$

⓮ $\frac{19}{2}+\frac{5}{4}=$

⓯ $\frac{8}{7}-\frac{4}{9}=$

⓰ $\frac{11}{4}-\frac{4}{3}=$

⓱ $\frac{35}{8}-\frac{5}{2}=$

⓲ $\frac{7}{2}-\frac{23}{9}=$

⓳ $16\frac{3}{4}+12\frac{1}{4}=$

⓴ $3\frac{2}{5}+4\frac{5}{11}=$

㉑ $7\frac{1}{7}+8\frac{1}{9}=$

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22 $4\frac{3}{8}-2\frac{1}{4}=$

23 $7\frac{5}{16}-5\frac{5}{8}=$

24 $5\frac{5}{7}-5\frac{1}{6}=$

25 $2-\frac{5}{8}=$

26 $3-\frac{2}{7}=$

27 $6-\frac{15}{4}=$

8.4 Multiplication of Fractions

› We multiply the numerator by the numerator, then we divide by the denominator multiplied by the denominator.

$$\frac{a}{b}\times\frac{c}{d}=\frac{a\times c}{b\times d}$$

$$\frac{\text{Numerator}\times\text{Numerator}}{\text{Denominator}\times\text{Denominator}}$$

› Fractions **do not need** to have a common denominator for multiplication.

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PROPER FRACTIONS

$$\frac{3}{4}\times\frac{2}{5}=\frac{3\times2}{4\times5}=\frac{6}{20}=\frac{3}{10} \qquad \frac{1}{2}\times\frac{5}{6}=\frac{5}{12}$$

$$\frac{2}{3}\times\frac{7}{8}=\frac{2\times7}{3\times8}=\frac{14}{24}=\frac{7}{12} \qquad \frac{3}{4}\times\frac{7}{8}=\frac{21}{32}$$

MIXED FRACTIONS AND FRACTIONS

› We first convert the **mixed fraction to an improper fraction**, then we apply the **multiplication** rule:

$$\frac{\text{Numerator}\times\text{Numerator}}{\text{Denominator}\times\text{Denominator}}$$

MIXED FRACTIONS × MIXED FRACTIONS

$$3\frac{2}{5}\times2\frac{4}{7}=\frac{15+2}{5}\times\frac{14+4}{7}=\frac{17}{5}\times\frac{18}{7}=\frac{306}{35}=8\frac{26}{35}$$

IMPROPER FRACTIONS × IMPROPER FRACTIONS

$$\frac{13}{5}\times\frac{7}{4}=\frac{13\times7}{5\times4}=\frac{91}{20}=4\frac{11}{20}$$

MIXED FRACTIONS × IMPROPER FRACTIONS

$$\frac{12}{5}\times4\frac{2}{3}=\frac{12}{5}\times\frac{12+2}{3}=\frac{12}{5}\times\frac{14}{3}=\frac{12\times14}{5\times3}=\frac{168}{15}=11\frac{3}{15}=11\frac{1}{5}$$

8.5 Division of Fractions

› We take the reciprocal of the fraction on the right. The numerator becomes the denominator and vice versa. This fraction is now called the reciprocal or inverse.

› We change the division sign to a multiplication sign and we apply the **multiplication** rule.

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1. **Reciprocal of a proper fraction or improper fraction:** ***interchange the numerator and the denominator.***

   › The reciprocal of $\frac{2}{3}$ is $\frac{3}{2}$.

   › The reciprocal of $\frac{14}{5}$ is $\frac{5}{14}$.

2. **Reciprocal of a whole number:**

   › The reciprocal of 6 is $\frac{1}{6}$.

   › The reciprocal of 30 is $\frac{1}{30}$.

   › The reciprocal of $\frac{1}{8}$ is 8.

3. **Reciprocal of a mixed fraction:** ***convert to an improper fraction, then interchange the numerator and the denominator.***

   › The reciprocal of $11\frac{1}{5} = \frac{56}{5}$ is $\frac{5}{56}$.

DIVISION OF FRACTIONS

Step 1: Find the reciprocal of the divisor (fraction on the right).

Step 2: Change the division sign to a multiplication sign.

Step 3: Multiply and reduce if necessary.

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EXAMPLES

$$\frac{2}{5} \div \frac{2}{3} = \frac{2}{5} \times \frac{3}{2} = \frac{6}{10} = \frac{3}{5} \qquad \frac{12}{5} \div \frac{6}{15} = \frac{12}{5} \times \frac{15}{6} = \frac{180}{30} = 6$$

$$3\frac{3}{4} \div 2\frac{2}{5} = \frac{15}{4} \div \frac{12}{5} = \frac{15}{4} \times \frac{5}{12} = \frac{75}{48} = 1\frac{27}{48} = 1\frac{9}{16}$$

PRACTICE 7

Multiply or divide the following fractions. Reduce if necessary.

1. $\frac{1}{5} \times \frac{2}{3} =$

2. $\frac{5}{7} \times \frac{6}{9} =$

3. $\frac{11}{4} \times \frac{5}{8} =$

4. $\frac{8}{3} \times \frac{12}{9} =$

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

6. $10\frac{3}{7} \times 2\frac{1}{5} =$

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7. $\frac{7}{10} \div \frac{3}{5} =$

8. $\frac{2}{7} \div \frac{1}{4} =$

9. $\frac{13}{6} \div \frac{11}{6} =$

10. $\frac{8}{100} \div \frac{4}{25} =$

11. $\frac{12}{5} \div \frac{4}{5} =$

12. $\frac{6}{9} \div \frac{6}{9} =$

13. $\frac{20}{3} \div \frac{5}{9} =$

14. $5\frac{5}{8} \div 2\frac{3}{16} =$

15. $8\frac{4}{7} \div 4\frac{3}{14} =$

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8.6 Convert Fractions to Decimal Numbers

› We divide the numerator by the denominator.

EXAMPLES

$\frac{1}{2} = 0.5$ $\begin{array}{r|l} 1 & 2 \\ 0 & 0.5 \\ \hline 10 & \\ 10 & \\ \hline 0 & \end{array}$ $\frac{9}{10} = 0.9$ $\begin{array}{r|l} 9 & 10 \\ 0 & 0.9 \\ \hline 90 & \\ 90 & \\ \hline 0 & \end{array}$ $\frac{8}{5} = 1.6$ $\frac{2}{9} = 0.22\overline{2}\ldots$

PRACTICE 8

Convert fractions to decimal numbers. Use your calculator.

	FRACTION	DECIMAL NUMBER
A	$\frac{1}{5}$	
B	$\frac{2}{3}$	
C	$\frac{14}{20}$	
D	$\frac{21}{30}$	

	FRACTION	DECIMAL NUMBER
E	$\frac{2}{7}$	
F	$\frac{1}{9}$	
G	$\frac{5}{8}$	
H	$\frac{6}{5}$	

8.7 Problems with Fractions

❶ Jennifer needed to run 2 km to compete in a halo race. After 15 minutes, she only ran $\frac{3}{4}$ of the race. How many kilometres did she run?

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2. A small cake was cut into 4 pieces. Taliyah ate $2\frac{1}{5}$ pieces of cake and Francis only ate $1\frac{3}{10}$ of a piece. How much of the cake is left?

3. Mark flew to Spain in $6\frac{1}{4}$ hours. He then flew to Germany for another $1\frac{2}{3}$ hours. How many hours was his flight time?

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4. Roberto is following a recipe. He needs $3\frac{1}{2}$ cups of oil and $\frac{3}{5}$ of a cup of water. How much liquid is required for his recipe?

5. Jane went shopping for her family. Her mother gave her a $50 bill. She spent $\frac{1}{10}$ of the money on a loaf of bread, $\frac{1}{4}$ on milk and $\frac{2}{5}$ on minced meat. How much money does she have left?

6. Kamil wanted to read three books over his summer holidays. He has already read $1\frac{1}{3}$ books in July and another $\frac{4}{9}$ in August. He has one week left of vacation. How much left does he need to read to meet his goal?

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7 CAM transport delivered $10\frac{8}{9}$ cases of eggs. Unfortunately, during transportation, $\frac{5}{6}$ of the cases were destroyed. How many cases were destroyed?

8 Christina works multiple part-time jobs. She worked $2\frac{3}{8}$ hours as a receptionist, $6\frac{1}{7}$ hours as a tutor and $2\frac{1}{4}$ hours as a caretaker. How many hours did she work this week?



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SOLUTIONS: FRACTIONS

PRACTICE 1

1. $\frac{3}{4}=\frac{9}{12}$
2. $\frac{6}{8}=\frac{3}{4}$
3. $\frac{1}{2}=\frac{6}{12}$
4. $\frac{15}{25}=\frac{3}{5}$
5. $\frac{37}{50}=\frac{74}{100}$
6. $\frac{28}{48}=\frac{7}{12}$
7. $\frac{1}{6}=\frac{2}{12}$
8. $\frac{60}{75}=\frac{4}{5}$
9. $\frac{24}{66}=\frac{4}{11}$
10. $\frac{1}{4}=\frac{3}{12}$
11. $\frac{72}{96}=\frac{9}{12}$
12. $\frac{9}{12}=\frac{108}{144}$
13. $\frac{7}{9}=\frac{42}{54}$
14. $\frac{18}{27}=\frac{6}{9}$
15. $\frac{32}{64}=\frac{16}{32}$
16. $\frac{12}{22}=\frac{6}{11}$
17. $\frac{12}{16}=\frac{3}{4}$
18. $\frac{9}{11}=\frac{18}{22}$
19. $\frac{15}{25}=\frac{3}{5}$
20. $\frac{32}{36}=\frac{8}{9}$
21. $\frac{40}{48}=\frac{5}{6}$
22. $\frac{18}{30}=\frac{6}{10}$
23. $\frac{120}{225}=\frac{8}{15}$
24. $\frac{81}{117}=\frac{9}{13}$

PRACTICE 2

1. $\frac{2}{4}=\frac{1}{2}$
2. $\frac{5}{40}=\frac{1}{8}$
3. $\frac{3}{12}=\frac{1}{4}$
4. $\frac{24}{36}=\frac{2}{3}$
5. $\frac{16}{48}=\frac{1}{3}$
6. $\frac{20}{60}=\frac{1}{3}$
7. $\frac{15}{85}=\frac{3}{17}$
8. $\frac{72}{81}=\frac{8}{9}$
9. $\frac{48}{72}=\frac{2}{3}$
10. $\frac{120}{144}=\frac{5}{6}$
11. $\frac{35}{45}=\frac{7}{9}$
12. $\frac{48}{56}=\frac{6}{7}$
13. $\frac{60}{95}=\frac{12}{19}$
14. $\frac{44}{64}=\frac{11}{16}$
15. $\frac{140}{200}=\frac{7}{10}$
16. $\frac{80}{20}=4$
17. $\frac{120}{150}=\frac{4}{5}$
18. $\frac{70}{75}=\frac{14}{15}$
19. $\frac{64}{72}=\frac{8}{9}$
20. $\frac{55}{77}=\frac{5}{7}$

PRACTICE 3

1. $\frac{15}{4}=3\frac{3}{4}$
2. $\frac{13}{2}=6\frac{1}{2}$
3. $\frac{17}{5}=3\frac{2}{5}$
4. $\frac{27}{4}=6\frac{3}{4}$
5. $\frac{23}{3}=7\frac{2}{3}$
6. $\frac{13}{11}=1\frac{2}{11}$
7. $\frac{63}{8}=7\frac{7}{8}$
8. $\frac{123}{15}=8\frac{1}{5}$
9. $\frac{103}{12}=8\frac{7}{12}$
10. $\frac{137}{32}=4\frac{9}{32}$

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PRACTICE 3

⓫ $\frac{25}{6} = 4\frac{1}{6}$ ⓬ $\frac{40}{12} = 3\frac{1}{3}$ ⓭ $\frac{30}{4} = 7\frac{1}{2}$ ⓮ $\frac{16}{6} = 2\frac{2}{3}$ ⓯ $\frac{75}{20} = 3\frac{3}{4}$

⓰ $\frac{30}{6} = 5$ ⓱ $\frac{32}{7} = 4\frac{4}{7}$ ⓲ $\frac{40}{6} = 6\frac{2}{3}$ ⓳ $\frac{54}{10} = 5\frac{2}{5}$ ⓴ $\frac{70}{18} = 3\frac{8}{9}$

PRACTICE 4

❶ $3\frac{1}{4} = \frac{13}{4}$ ❷ $5\frac{3}{7} = \frac{38}{7}$ ❸ $2\frac{3}{8} = \frac{19}{8}$ ❹ $5\frac{2}{3} = \frac{17}{3}$ ❺ $7\frac{2}{3} = \frac{23}{3}$

❻ $20\frac{3}{4} = \frac{83}{4}$ ❼ $4\frac{3}{14} = \frac{59}{14}$ ❽ $12\frac{2}{5} = \frac{62}{5}$ ❾ $9\frac{2}{7} = \frac{65}{7}$ ❿ $6\frac{9}{10} = \frac{69}{10}$

⓫ $4\frac{1}{7} = \frac{29}{7}$ ⓬ $6\frac{2}{5} = \frac{32}{5}$ ⓭ $9\frac{1}{6} = \frac{55}{6}$ ⓮ $8\frac{3}{4} = \frac{35}{4}$ ⓯ $15\frac{5}{8} = \frac{125}{8}$

⓰ $5\frac{3}{7} = \frac{38}{7}$ ⓱ $4\frac{2}{9} = \frac{38}{9}$ ⓲ $8\frac{1}{2} = \frac{17}{2}$ ⓳ $10\frac{2}{7} = \frac{72}{7}$ ⓴ $12\frac{7}{8} = \frac{103}{8}$

PRACTICE 5

❶ $\frac{2}{5}+\frac{1}{5} = \frac{3}{5}$ ❷ $\frac{2}{3}+\frac{1}{3} = \frac{3}{3} = 1$ ❸ $\frac{3}{7}+\frac{2}{7} = \frac{5}{7}$ ❹ $\frac{4}{9}+\frac{2}{9} = \frac{2}{3}$ ❺ $\frac{12}{25}+\frac{11}{25} = \frac{23}{25}$

❻ $\frac{6}{13}+\frac{2}{13} = \frac{8}{13}$ ❼ $\frac{2}{5}-\frac{1}{5} = \frac{1}{5}$ ❽ $\frac{6}{7}-\frac{3}{7} = \frac{3}{7}$ ❾ $\frac{11}{23}-\frac{4}{23} = \frac{7}{23}$ ❿ $\frac{13}{73}-\frac{10}{73} = \frac{3}{73}$

PRACTICE 6

❶ $\frac{1}{2}+\frac{1}{3} = \frac{5}{6}$ ❷ $\frac{2}{5}+\frac{1}{4} = \frac{13}{20}$ ❸ $\frac{1}{4}+\frac{1}{3} = \frac{7}{12}$ ❹ $\frac{5}{7}+\frac{1}{3} = 1\frac{1}{21}$ ❺ $\frac{2}{7}+\frac{1}{6} = \frac{19}{42}$ ❻ $\frac{2}{3}+\frac{1}{8} = \frac{19}{24}$

❼ $\frac{3}{5}-\frac{1}{15} = \frac{8}{15}$ ❽ $\frac{3}{4}-\frac{1}{16} = \frac{11}{16}$ ❾ $\frac{3}{4}-\frac{1}{2} = \frac{1}{4}$ ❿ $\frac{7}{10}-\frac{3}{5} = \frac{1}{10}$ ⓫ $\frac{2}{7}-\frac{1}{4} = \frac{1}{28}$

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PRACTICE 6

⑫ $\frac{2}{3}-\frac{1}{8}=\frac{13}{24}$ ⑬ $\frac{13}{6}+\frac{11}{6}=4$ ⑭ $\frac{19}{2}+\frac{5}{4}=10\frac{3}{4}$ ⑮ $\frac{8}{7}-\frac{4}{9}=\frac{44}{63}$ ⑯ $\frac{11}{4}-\frac{4}{3}=1\frac{5}{12}$ ⑰ $\frac{35}{8}-\frac{5}{2}=1\frac{7}{8}$

⑱ $\frac{7}{2}-\frac{23}{9}=\frac{17}{18}$ ⑲ $16\frac{3}{4}+12\frac{1}{4}=29$ ⑳ $3\frac{2}{5}+4\frac{5}{11}=7\frac{47}{55}$ ㉑ $7\frac{1}{7}+8\frac{1}{9}=15\frac{16}{63}$ ㉒ $4\frac{3}{8}-2\frac{1}{4}=2\frac{1}{8}$

㉓ $7\frac{5}{16}-5\frac{5}{8}=1\frac{11}{16}$ ㉔ $5\frac{5}{7}-5\frac{1}{6}=\frac{23}{42}$ ㉕ $2-\frac{5}{8}=1\frac{3}{8}$ ㉖ $3-\frac{2}{7}=2\frac{5}{7}$ ㉗ $6-\frac{15}{4}=2\frac{1}{4}$

PRACTICE 7

❶ $\frac{1}{5}\times\frac{2}{3}=\frac{2}{15}$ ❷ $\frac{5}{7}\times\frac{6}{9}=\frac{10}{21}$ ❸ $\frac{11}{4}\times\frac{5}{8}=1\frac{23}{32}$ ❹ $\frac{8}{3}\times\frac{12}{9}=3\frac{5}{9}$ ❺ $3\frac{3}{8}\times4\frac{1}{2}=15\frac{3}{16}$

❻ $10\frac{3}{7}\times2\frac{1}{5}=22\frac{33}{35}$ ❼ $\frac{7}{10}\div\frac{3}{5}=1\frac{1}{6}$ ❽ $\frac{2}{7}\div\frac{1}{4}=1\frac{1}{7}$ ❾ $\frac{13}{6}\div\frac{11}{6}=1\frac{2}{11}$ ❿ $\frac{8}{100}\div\frac{4}{25}=\frac{1}{2}$

⓫ $\frac{12}{5}\div\frac{4}{5}=3$ ⓬ $\frac{6}{9}\div\frac{6}{9}=1$ ⓭ $\frac{20}{3}\div\frac{5}{9}=12$ ⓮ $5\frac{5}{8}\div2\frac{3}{16}=2\frac{4}{7}$ ⓯ $8\frac{4}{7}\div4\frac{3}{14}=2\frac{2}{59}$

PRACTICE 8

	FRACTION	DECIMAL NUMBER
A	$\frac{1}{5}$	**0.2**
B	$\frac{2}{3}$	**0.666…**
C	$\frac{14}{20}$	**0.7**
D	$\frac{21}{30}$	**0.7**

	FRACTION	DECIMAL NUMBER
E	$\frac{2}{7}$	**$0.\overline{285714}$**
F	$\frac{1}{9}$	**0.111…**
G	$\frac{5}{8}$	**0.625**
H	$\frac{6}{5}$	**1.2**

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PROBLEMS

1. Jennifer needed to run 2 km to compete in a halo race. After 15 minutes, she only ran $\frac{3}{4}$ of the race. How many kilometres did she run?

Solution: $\left(2\times\frac{3}{4}\right)=\frac{6}{4}=\frac{3}{2}=1\frac{1}{2}$ km

2. A small cake was cut into 4 pieces. Taliyah ate $2\frac{1}{5}$ pieces of cake and Francis only ate $1\frac{3}{10}$ of a piece. How much of the cake is left?

Solution: $4-\left(2\frac{1}{5}+1\frac{3}{10}\right)=\frac{1}{2}$ piece of the cake is left.

3. Mark flew to Spain in $6\frac{1}{4}$ hours. He then flew to Germany for another $1\frac{2}{3}$ hours. How many hours was his flight time?

Solution: $6\frac{1}{4}+1\frac{2}{3}=7\frac{11}{12}$ hours

4. Roberto is following a recipe. He needs $3\frac{1}{2}$ cups of oil and $\frac{3}{5}$ of a cup of water. How much liquid is required for his recipe?

Solution: $3\frac{1}{2}+\frac{3}{5}=4\frac{1}{10}$ cups of liquid

5. Jane went shopping for her family. Her mother gave her a $50 bill. She spent $\frac{1}{10}$ of the money on a loaf of bread, $\frac{1}{4}$ on milk and $\frac{2}{5}$ on minced meat. How much money does she have left?

Solution: $50-\left(\frac{1}{10}\times 50+\frac{1}{4}\times 50+\frac{2}{5}\times 50\right)=50.00-37.50=\$12.50$ left

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PROBLEMS

6. Kamil wanted to read three books over his summer holidays. He has already read $1\frac{1}{3}$ books in July and another $\frac{4}{9}$ in August. He has one week left of vacation. How much left does he need to read to meet his goal?

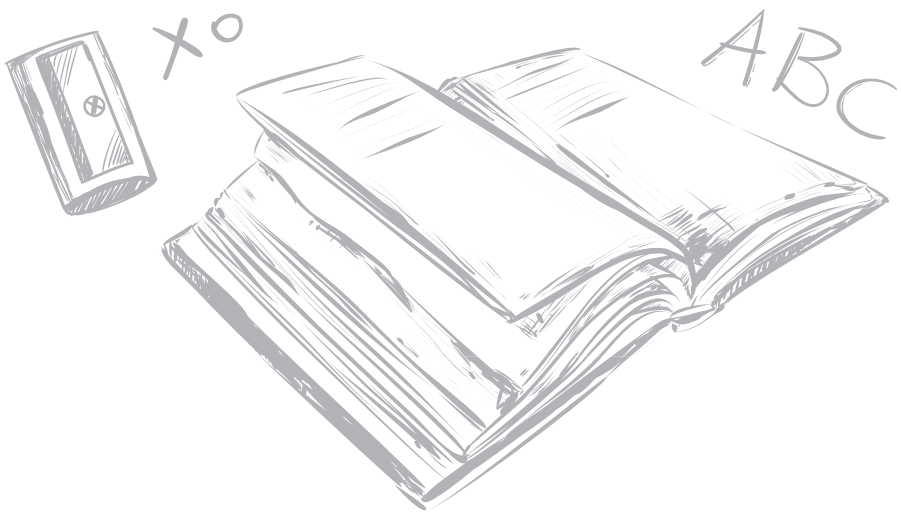
Solution: $3-\left(1\frac{1}{3}+\frac{4}{9}\right)=1\frac{2}{9}$ book to read

7. CAM transport delivered $10\frac{8}{9}$ cases of eggs. Unfortunately, during transportation, $\frac{5}{6}$ of the cases were destroyed. How many cases were destroyed?

Solution: $10\frac{8}{9}\times\frac{5}{6}=9\frac{2}{27}$ cases of eggs were destroyed.

8. Christina works multiple part-time jobs. She worked $2\frac{3}{8}$ hours as a receptionist, $6\frac{1}{7}$ hours as a tutor and $2\frac{1}{4}$ hours as a caretaker. How many hours did she work this week?

Solution: $2\frac{3}{8}+6\frac{1}{7}+2\frac{1}{4}=10\frac{43}{56}$ hours worked



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