

1.6 Multiplying Whole Numbers and Area

1.6 Exercise Set, page 56: 1, 3, 9, 13, 39, 57, 77

1.7 Dividing Whole Numbers

1.7 Exercise Set, page 71: 1, 7, 13, 21, 24, 25, 43, 75

Chapter 2 - Multiplying and Dividing Fractions

2.1 Introduction to Fractions and Mixed numbers

2.1 Exercise Set, page 118: 1, 3, 19, 34, 43, 55, 65, 85

2.2 Factors and Prime Factorization

2.2 Exercise Set, page 129: 4, 9, 17, 25, 55

2.1

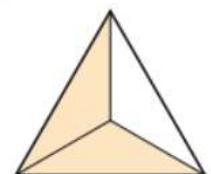
Memorize

Names	Fraction	Meaning
numerator →	$\frac{5}{6}$	← number of parts being considered
denominator →		← number of equal parts in the whole

Memorize

Objective C Identifying Proper Fractions, Improper Fractions, and Mixed Numbers 

A **proper fraction** is a fraction whose numerator is less than its denominator. Proper fractions are less than 1. For example, the shaded portion of the triangle's area is represented by $\frac{2}{3}$.

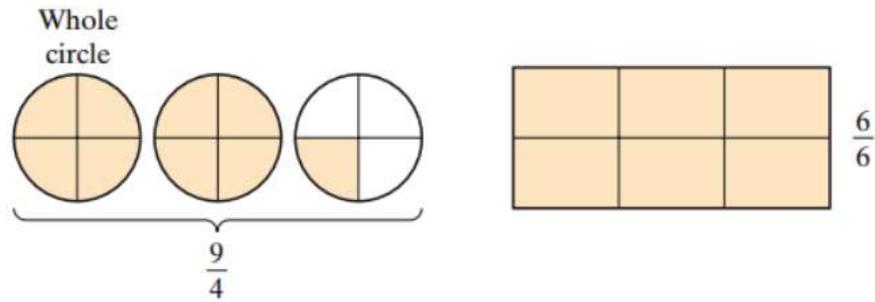


$\frac{2}{3}$

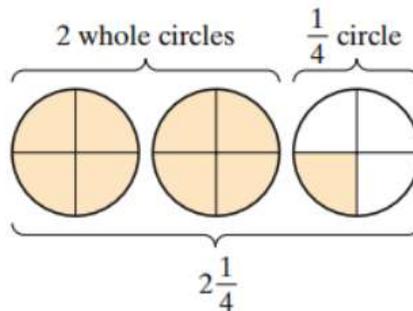
An **improper fraction** is a fraction whose numerator is greater than or equal to its denominator. Improper fractions are greater than or equal to 1. The shaded part of the group of circles' area below is $\frac{9}{4}$. The shaded part of the rectangle's area is $\frac{6}{6}$. (Recall from earlier that $\frac{6}{6}$ simplifies to 1 and notice that 1 whole figure or rectangle is shaded below.)

Whole circle





A **mixed number** contains a whole number and a fraction. Mixed numbers are greater than 1. Above, we wrote the shaded part of the group of circles as the improper fraction $\frac{9}{4}$. Now let's write the shaded part as a mixed number. The shaded part of the group of circles' area is $2\frac{1}{4}$. (Read "two and one-fourth.")



Memorize

Writing a Mixed Number as an Improper Fraction

To write a mixed number as an improper fraction:

Step 1: Multiply the denominator of the fraction by the whole number.

Step 2: Add the numerator of the fraction to the product from Step 1.

Step 3: Write the sum from Step 2 as the numerator of the improper fraction over the original denominator.

$$4\frac{7}{8} = \frac{39}{8}$$

$$(4)(8) + 7 = 32 + 7 = 39$$

$$\begin{array}{r} 4\frac{7}{8} \\ 8 \overline{) 39} \\ \underline{32} \\ 39 \\ \underline{32} \\ 39 \\ \underline{32} \\ 39 \end{array}$$

$$\begin{array}{r} 813 \overline{) 4} \\ \underline{32} \\ 7 \end{array}$$

Memorize

Writing an Improper Fraction as a Mixed Number or a Whole Number

To write an improper fraction as a mixed number or a whole number:

Step 1: Divide the denominator into the numerator.

Step 2: The whole number part of the mixed number is the quotient. The fraction part of the mixed number is the remainder over the original denominator.

$$\text{quotient} \frac{\text{remainder}}{\text{original denominator}}$$

2.2

Memorize

Recall that when numbers are multiplied to form a product, each number is called a factor. Since $5 \cdot 9 = 45$, both 5 and 9 are **factors** of 45, and $5 \cdot 9$ is called a **factorization** of 45.

Memorize

Prime Numbers

A **prime number** is a natural number that has exactly two different factors, 1 and itself.

$$1 = 1 \cdot 1 \text{ prime}$$

$$2 = 2 \cdot 1 \text{ prime}$$

$$3 = 3 \cdot 1 \text{ prime}$$

$$4 = 4 \cdot 1 = 2 \cdot 2 \text{ (composite) not prime}$$

$$5 = 5 \cdot 1 \text{ prime}$$

$$6 = 3 \cdot 2 \text{ composite}$$

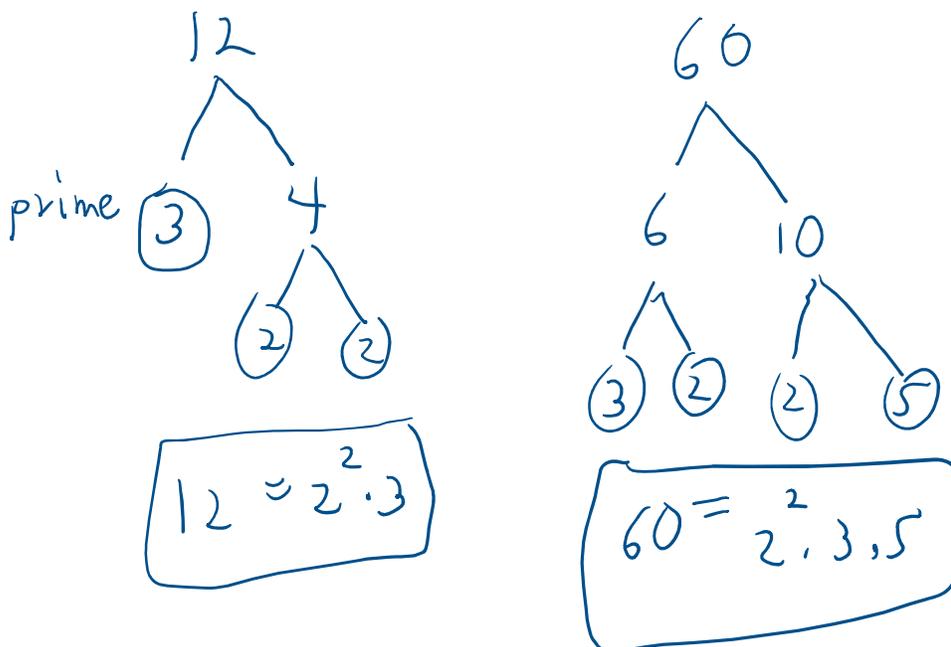
$$6 = 3 \cdot 2 \text{ composite}$$

Memorize

Prime Factorization

The **prime factorization** of a number is the factorization in which all the factors are prime numbers.

Prime factorization of a number means writing the number as a product of powers of prime numbers



$$56782498 = 2 \times \underbrace{28391249}_{\text{prime}}$$

$$2^4 \times 3^3 \times 6^2 \times 25 = 388800$$

Factor into a product of powers of primes
 $388800 = 2^6 3^5 5^2$ (in increasing order)

Supplied

Divisibility Tests

A whole number is divisible by:

- 2 if the last digit is 0, 2, 4, 6, or 8.



132 is divisible by 2 since the last digit is a 2.

- 3 if the sum of the digits is divisible by 3.

144 is divisible by 3 since $1 + 4 + 4 = 9$ is divisible by 3.

- 5 if the last digit is 0 or 5.



1115 is divisible by 5 since the last digit is a 5.