Unit 3
Fractions (LCM and LCD)

Math Essentials

1

Warm-up

Multiply and simplify.

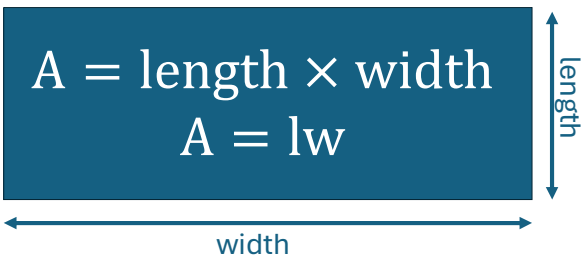
1. $\frac{7}{-6} \cdot \frac{1}{3} \cdot (-7)$
2. $\left(-\frac{5}{3}\right)^3 =$
3. $-\frac{3}{2^2} =$

ALEKS Topic

2

Area of a Rectangle?

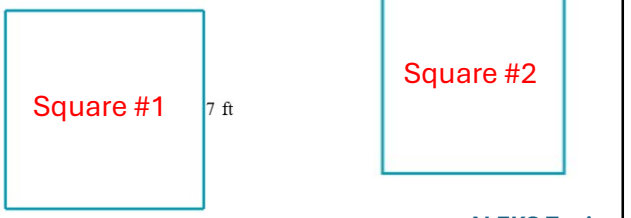
$$A = \text{length} \times \text{width}$$
$$A = lw$$



3

Practice 3.1

Find the area of the following squares.



ALEKS Topic

4

Consider...

Tom ate $1\frac{3}{8}$ of a pizza and Jerry ate $2\frac{7}{8}$ of a pizza. If the pizzas are cut into 8 slices, how many slices did each eat?

5

Practice 3.2

Add the following and simplify.

1. $1 + \frac{2}{5}$
2. $4 + \frac{3}{10}$

6

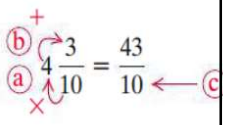
Mixed Numerals

To convert from a mixed numeral like $4\frac{3}{10}$ to fraction notation:

(a) Multiply the whole number by the denominator: $4 \cdot 10 = 40$.

(b) Add the result to the numerator: $40 + 3 = 43$.

(c) Keep the denominator.

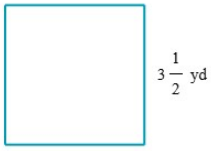


7

Practice 3.3

Find the area of the following square.

Write your answer in simplest form. Be sure to include the correct unit in your answer.



ALEKS Topic

8

Practice 3.4

Divide and simplify.

$$5\frac{1}{2} \div 3\frac{1}{4}$$

ALEKS Topic

9

Multiples

List the first 10 multiples of 2, 3, and 5

- $2 \rightarrow 2, 4, 6, 8, 10, 12, 14, 16, 18, 20$
- $3 \rightarrow 3, 6, 9, 12, 15, 18, 21, 24, 27, 30$
- $5 \rightarrow 5, 10, 15, 20, 25, 30, 35, 40, 45, 50$

10

Divisibility

- A number b is **divisible** by another number a if b is a multiple of a.
  - Example: 3, 6, 9, 12,… are all divisible by 3

11

Tests for Divisibility

A number is divisible by **2** (is even) if it has a ones digit of 0, 2, 4, 6, or 8 (an even ones digit).

Example: 4542 is divisible by 2.

12

Tests for Divisibility

A number is divisible by **5** if its ones digit is a 5 or 0.

Example: 185 is divisible by 5.

13

Tests for Divisibility

A number is divisible by **10** if its ones digit is a 0.

Example: 1850 is divisible by 10.

14

Tests for Divisibility

A number is divisible by **3** if the sum of its digits is divisible by 3.

Example: 459
4+5+9=18
18 is divisible by 3, so 459 is divisible by 3.

15

Tests for Divisibility

A number is divisible by **9** if the sum of its digits is divisible by 9.

Example: 459

4+5+9=18

18 is divisible by 9, so 459 is divisible by 9.

16

Tests for Divisibility

A number is divisible by **6** if its ones digit is 0, 2, 4, 6, or 8 (is even) AND the sum of its digits is divisible by 3.

Example: Is 4530 divisible by 6?

4+5+3+0=12

12 is divisible by 3 AND it is even, so yes!

17

Divisible by…	2?	3?	5?	6?	9?	10?
5	✗	✗	✓	✗	✗	✗
89	✗	✗	✗	✗	✗	✗
1302	✓	✓	✗	✓	✗	✗
68,940	✓	✓	✓	✓	✓	✓

18

Consider...

What is the LEAST COMMON multiple of 3 and 5?

19

Multiples

List the first 10 multiples of 2, 3, and 5

- $2 \rightarrow 2, 4, 6, 8, 10, 12, 14, 16, 18, 20$
- $3 \rightarrow 3, 6, 9, 12, 15, 18, 21, 24, 27, 30$
- $5 \rightarrow 5, 10, 15, 20, 25, 30, 35, 40, 45, 50$

20

Least Common Multiple

The **least common multiple**, or LCM, of two natural numbers is the smallest number that is a multiple of both numbers.

21

Practice 3.5

What is the LEAST common multiple of…

- 12 and 45?
- 6 and 9?

22

Least Common Multiple

Method 1. Using a list of multiples:

Look at the largest number. Is it a multiple of the others?

1. If YES, it is the LCM!
2. If NO, list multiples of the largest number until you get one that is a multiple of each of the others.

23

Prime and Composite Numbers

- A number is **prime** if it has exactly two different factors (only itself and 1).
  - Is 1 prime??
  - NO! It has only 1 factor.
- A number that has more than 2 factors is called **composite.**

24

Practice 3.6

List all the prime numbers between 1 and 30.

25

Prime Factorizations

$$220 = 2 \cdot 2 \cdot 5 \cdot 11$$

To find the prime factorization of a number, write the composite number as a product of primes.

It can help to make a factor tree.

26

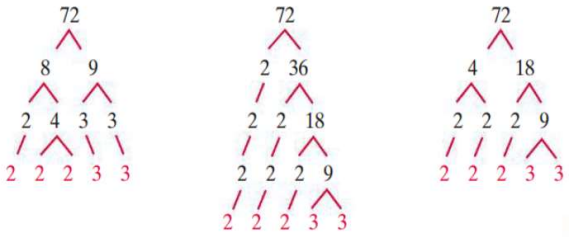
Practice 3.7

Find the prime factorizations of the following numbers.

1. 5
2. 45
3. 72

ALEKS Topic

27



28

Least Common Multiple

Method 2 (to find the LCM). Using prime factorizations:

1. Write the prime factorization of each number.
2. Make a list of all the factors needed to included everything in EACH list of factors (including any repeats).
3. Multiply the factors.

29

Practice 3.8

Find the LCM of the following pairs.

1. 18 and 21
2. 7 and 21
3. 24 and 36

30

Practice 3.9

Find the LCD

$$\frac{7}{6} \text{ and } \frac{5}{8}$$

ALEKS Topic

31

Order

Tom ate $\frac{1}{4}$ of a pizza. Jerry ate $\frac{3}{8}$ of a pizza. Who ate more pizza?

32

Order

To compare two fractions, first get a common denominator.

Which is bigger: $\frac{2}{5}$ or $\frac{3}{8}$?

33

Order

First, rewrite $\frac{2}{5}$ and $\frac{3}{8}$ so that they have a common denominator.

Then, use $<$, $=$, or $>$ to order $\frac{2}{5}$ and $\frac{3}{8}$.

$\frac{2}{5} = \frac{\square}{\square}$; $\frac{3}{8} = \frac{\square}{\square}$

$\frac{2}{5} \square \frac{3}{8}$

ALEKS Topic

34

Practice 3.10

Use < or > to form a true sentence.

1. $\frac{5}{6}$ $\frac{2}{3}$
2. $\frac{7}{8}$ $\frac{2}{3}$
3. $\frac{-89}{100}$ $\frac{9}{10}$

35

Perfect Squares

Find the squares.

- $1^2 = ?$
- $2^2 = ?$
- $3^2 = ?$
- $4^2 = ?$
- $5^2 = ?$
- $6^2 = ?$
- $7^2 = ?$
- $8^2 = ?$
- $9^2 = ?$
- $10^2 = ?$

Memorize these!!

36

Square Roots

$$(\ ?\ )^2 = 16$$
$$(\ ?\ ) \times (\ ?\ ) = 16$$

What are the square root(s) of 16?

$$4 \quad AND \quad -4$$

37

Square Roots

If $c^2 = a$,

then c is a square root of a.

38

Square Roots

What are the square roots of -9?

$$(\ ?\ )^2 = -9$$
$$(\ ?\ ) \times (\ ?\ ) = -9$$

There are none!! At least, no REAL roots...

39

Practice 3.11

Find all real square roots of the following numbers.

1. 16
2. 100
3. -81

40

Square Roots

$$\sqrt{16} = ?$$

If n is a positive number, $\sqrt{n}$ means the **positive** square root of n.

Example: $\sqrt{9} = 3$

41

Practice 3.12

Simplify.

1. $\sqrt{64}$
2. $-\sqrt{64}$
3. $\sqrt{-64}$
4. $-\sqrt{-64}$

42

Practice 3.13

Simplify.

1. $\sqrt{\frac{4}{9}}$

43

Quotient Property

$$\sqrt{\frac{a}{b}} = \frac{\sqrt{a}}{\sqrt{b}}$$

for any positive real numbers a and b

44

Practice 3.13

Simplify.

1. $\sqrt{\frac{4}{9}}$
2. $\sqrt{\frac{45}{125}}$ Simplify the fraction first!

45