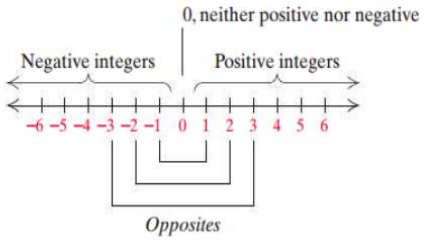
Unit 5
Decimals

Math Essentials

1

Integers- the whole numbers and their opposites



2

	Integer?	
	Yes	No
$\frac{13}{8}$	○	○
64.95	○	○
$\frac{36}{4}$	○	○
$-\frac{30}{6}$	○	○
43	○	○

Practice 5.1

Classify each number as an integer or not.

ALEKS Topic

3

Practice 5.2

Write each decimal as a fraction.

1. $0.1 =$
2. $0.5 =$
3. $0.25 =$
4. $1.5 =$

4

What is a decimal?

The set of rational numbers consists of the integers …,-2,-1, 0, 1, 2,…, and fractions like $\frac{1}{2}$, $-\frac{701}{8234}$, ….

Using decimal notation, we can write

$$0.875 = \frac{7}{8} \qquad 48.97 = 48\frac{97}{100}$$

5

Decimal Notation and Word Names

What does the value $24.99 mean?

$$\$24 + \$0.99$$

$$2 \cdot 10 + 4 \cdot 1 + 9 \cdot \frac{1}{10} + 9 \cdot \frac{1}{100}$$

6

Decimal Notation and Word Names

How do you say this number?

3.46583 min, the winning time for a gold medal by the U.S. men's 4x100 meters medley relay team in Rio.

7

PLACE-VALUE CHART

Hundreds	Tens	Ones	*Tenths*	*Hundredths*	*Thousandths*	Ten-*Thousandths*	Hundred-*Thousandths*
100	10	1	$\frac{1}{10}$	$\frac{1}{100}$	$\frac{1}{1000}$	$\frac{1}{10,000}$	$\frac{1}{100,000}$
		3	. 4	6	5	8	3

8

The decimal notation 3.46583 means

$$3 + \frac{4}{10} + \frac{6}{100} + \frac{5}{1000} + \frac{8}{10,000} + \frac{3}{100,000}, \quad \text{or} \quad 3\frac{46,583}{100,000}.$$

We read both 3.46583 and $3\frac{46,583}{100,000}$ as

"Three *and* forty-six thousand five hundred eighty-three hundred-thousandths."

9

Say a word name for each number.

1. 989.6
2. 245.89
3. 0.009

10

Practice 5.3

Write each in fraction notation.

1. 0.9
2. 0.009
3. 1.6

11

Converting Between Decimals and Fractions

To convert from decimal notation to fraction notation,

a) count the number of decimal places, 4.98 — 2 places

b) move the decimal point that many places to the right, and 4.98. Move 2 places.

c) write the answer over a denominator of 1 followed by that number of zeros. $\frac{498}{100}$ 2 zeros

12

Which is greater?

$0.9 \; or \; 0.85$

First note that $0.9 = 0.90$ (because $\frac{9}{10} = \frac{90}{100}$)

Also, $0.85 = \frac{85}{100}$

So $\frac{85}{100} < \frac{90}{100}$ and $0.85 < 0.9$

13

Order

To compare two positive numbers in decimal notation,

1. Start at the left and compare corresponding digits, moving from left to right.
2. When two digits differ, the number with the larger digit is the larger of the two numbers.

14

Practice 5.4

Fill in the blank with < or >

1. $0.06 \_\_\_ 0.008$
2. $0.5 \_\_\_ 0.58$
3. $1 \_\_\_ 0.9999$
4. $-34.01 \_\_\_ -34.008$

15

Rounding

To round…

1. Locate the digit in that place.
2. Look to the right.
3. If the digit to the right is 5 or more, add 1. If it is 4 or less, keep the original digit the same.
4. Drop all numbers to the right.

16

Practice 5.5

Round each to the given value.

1. 0.37 to the nearest tenth
2. 72.3846 to the nearest hundredth
3. 0.95 to the nearest tenth
4. 0.896 to the nearest hundredth.

ALEKS Topic

17

Remember??

Add the following

1. $2600 + 104$
2. $56{,}314 + 1{,}778$
3. $56.314 + 17.78$

18

Addition

Adding decimals is similar to adding whole numbers!

1. Line up decimal points
2. Add digits from the right
3. Carry if necessary

19

Practice 5.6

Add the following.

$$3456 + 19.347$$

ALEKS Topic

20

Practice 5.7

Christine ran four times last week. Here are the distances she ran (in kilometers).

$$14, 2.05, 13.3, 4.6$$

What is the total distance Christine ran on these four days?

ALEKS Topic

21

Remember??

Subtract the following

1. $2600 - 104$
2. $56.314 - 17.78$

22

Subtraction

1. Line up decimal points
2. Subtract from the right.
3. Borrow if necessary.

23

Practice 5.8

Subtract.

1. $37.48 - 26.2$
2. $38.71 - 4 - 3.2$

ALEKS Topic

24

Practice 5.9

Susan buys an item for $6.12. She gives the cashier a $20 bill. How much money should Susan get back?

ALEKS Topic

25

Practice 5.10

Compute.

1. $-3.384 - 5.76 =$
2. $12.54 + (-24.673) =$

ALEKS Topic

26

Adding and Subtracting with Negatives

1. If both numbers have the same sign (+ or -), find the sum.
2. If the numbers have different signs, find the difference. Put the bigger number on top.
3. Take the sign of the bigger number.

27

Practice 5.11

Compute.

$$3.6 - 7 - 1.3$$

ALEKS Topic

28

Remember??

Multiply the following

$$362 \times 7$$

29

Multiplication

Multiplying decimals is similar to multiplying whole numbers!

1. Ignore the decimal points and multiply.
2. Add the decimal points in each factor and use that many decimals in the product.

30

Practice 5.12

Multiply.

1. 36.2×7
2. -7×0.0125

ALEKS Topic

31

Practice 5.13

Bill needs 68.7 square feet of laminated wood. Suppose each square foot of laminated wood costs $0.80. Find the amount he has to pay.

ALEKS Topic

32

Any idea?

Multiply the following.

1. 8×10
2. 8×100
3. 38×10

33

To multiply by 10, 100, 1000, …

1. Count the number of decimal places (zeros)
2. Move the decimal that many places to the right.

$6.57 \times 10{,}000$
(4 places to the RIGHT)
$= 65700$

34

Practice 5.14

Multiply the following.

1. 10×14.605
2. -2.4167×1000
3. 10×3.354

ALEKS Topic

35

Practice 5.15

1. Divide $120 \div 8$
2. Divide $655 \div 5$
3. Divide $\frac{6831}{3}$

Long Division
1. Estimate
2. Multiply
3. Subtract
4. Bring Down

36

Division

Dividing decimals is similar to dividing whole numbers!

To divide by a whole number,

a) place the decimal point directly above the decimal point in the dividend, and

b) divide as though dividing whole numbers.

$$\begin{array}{r} 0.8\ 4 \leftarrow \text{Quotient} \\ \text{Divisor} \rightarrow 7\ \overline{)\ 5.8\ 8} \leftarrow \text{Dividend} \\ \underline{5\ 6} \\ 2\ 8 \\ \underline{2\ 8} \\ 0 \leftarrow \text{Remainder} \end{array}$$

37

Practice 5.16

Divide the following.

$$2.56 \div 8$$

ALEKS Topic

38

Practice 5.17

Divide the following.

1. $8 \div 10$
2. $8 \div 100$
3. $28.5 \div 100$

ALEKS Topic

39

To divide by powers of 10

1. Count the number of decimal places (zeros).
2. Move the decimal that many places to the LEFT

$6.57 \div 10{,}000$

(4 places to the RIGHT)

So to divide, move LEFT

$= 0.000657$

40

Practice 5.18

Deandre's annual salary is $34,000. A total of $10,186.72 will be deducted for taxes and health insurance. He will receive his paycheck monthly in 12 equal installments. How much will he get paid with each paycheck?

ALEKS Topic

41

Practice 5.19

A phone company charges each customer a monthly fee of $11.75. In addition, it charges $0.05 per minute for in-state calls and $0.13 per minute for out-of-state calls. What is the total monthly charge for a customer who made 450 minutes of in-state calls and 83 minutes of out-of-state calls?

ALEKS Topic

42

Practice 5.23

Order these numbers from least to greatest.

$$7.241, 7.26, \frac{29}{4}, 7\frac{1}{3}$$

ALEKS Topic

43