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Go to *Grade 4 Everyday Mathematics* Sample Lesson

4•3 Comparing and Ordering Decimals

Objective To guide students as they compare and order decimals in tenths and hundredths.

1 Teaching the Lesson

Key Activities

Students compare decimals using base-10 blocks. They append zeros to decimals in order to compare them. Then they put sets of decimals in sequential order.

Key Concepts and Skills

- Model decimals through hundredths with base-10 blocks. [Number and Numeration Goal 1]
- Read and write decimals through hundredths. [Number and Numeration Goal 1]
- Rename fractions with 100 in the denominator as decimals. [Number and Numeration Goal 5]
- Compare and order decimals through hundredths. [Number and Numeration Goal 6]

Key Vocabulary decimal

Ongoing Assessment: Informing Instruction See page 251.

Ongoing Assessment: Recognizing Student Achievement Use journal page 83. [Number and Numeration Goal 6]

materials

- ☐ *Math Journal 1,* pp. 82 and 83
- ☐ Study Link 4•2
- ☐ base-10 blocks
- ☐ slate

2 Ongoing Learning & Practice

Students play *Product Pile-Up* to practice multiplication facts.

Students practice and maintain skills through Math Boxes and Study Link activities.

materials

- ☐ *Math Journal 1,* p. 84
- ☐ *Student Reference Book,* p. 259
- ☐ Study Link Master (*Math Masters,* p. 112)
- ☐ number cards 1–10 (8 of each)

3 Differentiation Options

READINESS

Students play *Coin Top-It* to practice comparing decimals in a money context.

ENRICHMENT

Students create riddles and order decimals to solve them.

EXTRA PRACTICE

Students solve problems involving decimals.

ELL SUPPORT

Students create a Decimals All Around Museum.

materials

- ☐ Game Masters (*Math Masters,* pp. 467 and 506)
- ☐ scissors; coins
- ☐ *5-Minute Math,* pp. 14, 89, and 94
- ☐ *The Everything Kids' Joke Book: Side-Splitting, Rib-Tickling Fun*
- ☐ *Kids' Funniest Jokes*

See **Advance Preparation**

Additional Information

Advance Preparation For the optional Enrichment activity in Part 3, obtain the books *The Everything Kids' Joke Book: Side-Splitting, Rib-Tickling Fun* by Michael Dahl (Adams Media Corporation, 1992) and *Kids' Funniest Jokes* edited by Shelia Anne Barry (Sterling Publishing Co., 1993).

Technology

Assessment Management System
Journal page 83, Problem 1
See the **iTLG.**

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Getting Started

Mental Math and Reflexes

Write decimals on the board and ask students to read them. *Suggestions:*

●○○ 0.5	●●○ 34.12	●●● 0.984
0.76	9.03	0.733
0.14	465.81	0.804

Math Message

Solve Problem 1 on journal page 82.

Study Link 4•2 Follow-Up

Have students share examples of decimals they brought from home. Discuss their meanings and values. Use such language as, *The label on a package of chicken reads "2.89 pounds." 2.89 pounds is between 2 and 3 pounds. It is almost 3 pounds.* Encourage students to continue bringing examples of decimals to display in a Decimals All Around Museum. See the optional ELL Support activity in Part 3 for details.

1 Teaching the Lesson

Math Message Follow-Up

WHOLE-CLASS DISCUSSION

(*Math Journal 1,* p. 82)

Discuss ways to show that $0.3 > 0.15$. Be sure to include the following two methods:

- Model **decimals** with base-10 blocks. If a flat is ONE, then 0.3 is $\frac{3}{10}$ of the flat, or 3 longs, and 0.15 is $\frac{15}{100}$ of the flat, or 15 cubes. Because 3 longs are more than 15 cubes, $0.3 > 0.15$.
- Rename one of the decimals so that both decimals have the same number of digits to the right of the decimal point. Do so by appending zeros to the decimal having fewer digits after the decimal point. In this problem, show that $0.3 = 0.30$ by trading 3 longs for 30 cubes. Because 30 cubes are more than 15 cubes, $0.30 > 0.15$. Therefore, $0.3 > 0.15$.

Have students use base-10 blocks to complete Problem 2 on journal page 82.

Ongoing Assessment: Informing Instruction

Watch for students who think 0.3 is less than 0.15 because 3 is less than 15. Modeling the problems with base-10 blocks and then trading longs for cubes can help students understand why zeros can be appended to a decimal without changing its value.

Writing a zero at the end of a decimal corresponds to thinking about the number in terms of the next smaller place. For example, 30 hundredths, 0.30, or 30 cubes is greater than 15 hundredths, 0.15, or 15 cubes. Note how this differs from the situation with whole numbers: With whole numbers, the number with more digits is always greater.

Student Page

Date Time

LESSON 4•3 **Comparing Decimals**

Math Message

1. Arjun thought that 0.3 was less than 0.15. Explain or draw pictures to help Arjun see that 0.3 is more than 0.15.

Sample answer: Model the decimals with base-10 blocks. Model 0.3 using 3 longs and model 0.15 using 1 long and 5 cubes. 3 longs is greater than 1 long and 5 cubes, so 0.3 > 0.15.

2. Use base-10 blocks to complete the following table.

"<" means "is less than."
">" means "is greater than."

Base-10 Blocks	Decimal	>, <, or =	Decimal	Base-10 Blocks
▮	0.2	>	0.12	▮▪▪
▪▪▪▪▪	0.05	<	0.1	▮
▮▪▪▪	0.13	<	0.31	▮▮▮▪
▮▮▮▪▪▪	0.33	>	0.3	▮▮▮
□▮▮	1.2	<	2.1	□□▮
▮▮▮▪▪▪▪▪	0.47	>	0.39	▮▮▮▪▪▪▪▪
□□▮▮▮	2.3	=	2.3	□▮▮▮▮▮▮▮▮▮

Math Journal 1, p. 82

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Student Page

Date Time

LESSON 4•3 **Ordering Decimals**

1. Write < or >.

a. 0.24 > 0.18 b. 0.05 < 0.1 c. 0.2 < 0.35

d. 1.03 > 0.30 e. 3.2 < 6.59 f. 25.9 > 25.72

2. Write your own decimals to make true number sentences. Sample answers:

a. 0.9 > 0.2 b. 1.06 < 1.07 c. −1.5 < 0.003

3. Put these numbers in order from smallest to largest.

	smallest			largest
a. 0.05, 0.5, 0.55, 5.5	0.05	0.5	0.55	5.5
b. 0.99, 0.27, 1.8, 2.01	0.27	0.99	1.8	2.01
c. 2.1, 2.01, 20.1, 20.01	2.01	2.1	20.01	20.1
d. 0.01, 0.10, 0.11, 0.09	0.01	0.09	0.10	0.11

4. Write your own decimals in order from smallest to largest. Sample answer:

smallest			largest
0.03	0.08	0.3	0.33

5. "What's green inside, white outside, and hops?"
To find the answer, put the numbers in order from smallest to largest.

0.66	1	0.2	1.05	0.90	0.01	0.75	0.35	$\frac{25}{100}$	$\frac{50}{100}$	0.05	0.09	5.5
N	I	O	C	W	A	D	S	G	A	F	R	H

Write your answers in the following table. The first answer is done for you.

0.01	0.05	0.09	0.2	$\frac{25}{100}$	0.35	$\frac{50}{100}$	0.66	0.75	0.90	1	1.05	5.5
A	F	R	O	G	S	A	N	D	W	I	C	H

***Math Journal 1,* p. 83**

Student Page

Games

Product Pile-Up

Materials □ number cards 1–10 (8 of each)
Players 3 to 5
Skill Multiplication facts 1 to 10
Object of the game To play all of your cards and have none left.

Directions

1. Shuffle the cards and deal 12 cards to each player. Place the rest of the deck number-side down on the table.
2. The player to the left of the dealer begins. This player selects 2 of their cards, places them number-side up on the table, multiplies the numbers, and gives the product.
3. Play continues with each player selecting and playing 2 cards with a product that is *greater than* the product of the last 2 cards played.

Example Joe plays 3 and 6 and says, "3 times 6 equals 18."
The next player, Rachel, looks at her hand to find 2 cards with a product higher than 18. She plays 5 and 4 and says, "5 times 4 equals 20."

4. If a player is not able to play 2 cards with a greater product, the player must draw 2 cards from the deck. These 2 cards are added to the player's hand. If the player is now able to make a greater product, the 2 cards are played, and play continues.
5. If after drawing the 2 cards a player still cannot make a play, the player says "Pass." If all the other players say "Pass," the last player who was able to lay down 2 cards starts play again. That player may select any 2 cards to make *any* product and play continues.
6. If a player states an incorrect product, he or she must take back the 2 cards, draw 2 cards from the deck, and say "Pass." Play moves to the next person.
7. The winner is the first player to run out of cards, or the player with the fewest cards when there are no more cards to draw.

***Student Reference Book,* p. 259**

Ordering Decimals

PARTNER ACTIVITY

(*Math Journal 1,* p. 83)

Students compare and order decimals. Base-10 blocks should be available. English language learners may struggle with understanding the answer to the riddle in Problem 5.

Ongoing Assessment: Recognizing Student Achievement

Journal page 83 Problem 1

Use **journal page 83, Problem 1** to assess students' ability to compare decimals through hundredths. Students are making adequate progress if they are able to solve Problems 1a–1f correctly. In Problem 2, some students may demonstrate the ability to compare decimals beyond hundredths or decimals less than 0.

[Number and Numeration Goal 6]

2 Ongoing Learning & Practice

Playing *Product Pile-Up*

SMALL-GROUP ACTIVITY

(*Student Reference Book,* p. 259)

Students play *Product Pile-Up* to develop automaticity with multiplication facts. Consider playing against three or four students to model the game.

Adjusting the Activity

ELL

Math Boxes are designed to provide distributed practice. Math Boxes routinely revisit recent content to help students build and maintain important concepts and skills. One or two problems on each journal page preview content for the coming unit. Use class performance on these problems as you plan for the coming unit.

Math Boxes 4•3

INDEPENDENT ACTIVITY

(*Math Journal 1,* p. 84)

Mixed Practice Math Boxes in this lesson are paired with Math Boxes in Lesson 4-1. The skill in Problem 6 previews Unit 5 content.

Writing/Reasoning Have students write a response to the following: *In Problem 4, is* $\overrightarrow{TC}$ *another name for* $\overrightarrow{CT}$*? Explain why or why not.* No. Sample answer: The endpoint of ray *CT* is point *C,* so ray *TC* is not the same as ray *CT*. The first letter in the name of a ray is the ray's endpoint.

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Study Link 4•3

INDEPENDENT ACTIVITY

(*Math Masters,* p. 112)

Home Connection Students order decimals on a number line and find decimals between two given amounts.

3 Differentiation Options

READINESS

PARTNER ACTIVITY

Playing *Coin Top-It*

5–15 Min

(*Math Masters,* pp. 467 and 506)

To provide experience comparing decimals in a money context, have students play *Coin Top-It.* Ask them to model the amounts shown on the cards with actual coins and record play on *Math Masters,* page 506.

1. Each player cuts apart a copy of *Math Masters,* page 467. Players shuffle the cards and place them facedown.
2. Each player draws one card and says the total amount of the coins. The player with the greater amount keeps both cards. In case of a tie, each player takes another card. The player with the larger amount takes all of the cards.
3. The game ends when no cards are left. The player who collects more cards wins.

Student Page

Date Time

LESSON 4•3 **Math Boxes**

1. Solve mentally.
   a. 5 * 8 = 40
   b. 9 * 9 = 81
   c. 9 * 3 = 27
   d. 42 ÷ 6 = 7
   e. 54 ÷ 9 = 6
   f. 63 ÷ 7 = 9

2. Solve each open sentence.
   a. 100 + w = 175 w = 75
   b. 503 + y = 642 y = 139
   c. p + 263 = 319 p = 56
   d. 444 − s = 93 s = 351
   e. r − 320 = 600 r = 920

3. In 34.561
   a. The 3 is worth 30.
   b. The 4 is worth 4.
   c. The 5 is worth 0.5.
   d. The 6 is worth 0.06.
   e. The 1 is worth 0.001.

4. Draw and label ray *CT*. Draw point *A* on it.
   Sample answer:

5. Insert parentheses to make these number sentences true.
   a. (7 * 8) − 6 = 50
   b. (13 − 4) * 6 = 54
   c. 10 = 3 + (49 / 7)
   d. 28 = (28 − 6) + (42 / 7)

6. Estimate the sum. Write a number model to show how you estimated.
   3,005 + 9,865 + 2,109
   Number model: Sample answer: 3,000 + 10,000 + 2,000 = 15,000

Math Journal 1, p. 84

Game Master

Name Date Time

Coin Cards

	N N P P P P	D D N P P	Q D P P P P
Q D N P P P	Q D D P P P		
Q Q D N P P	Q Q D D P	Q Q Q P P P	Q Q Q N P P P
Q Q Q D N P	Q Q Q D D P	Q Q Q D D N	Q Q Q Q D P P

Math Masters, p. 467

Study Link Master

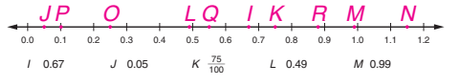
Name Date Time

STUDY LINK 4•3 **Ordering Decimals**

Mark the approximate locations of the decimals and fractions on the number lines below. Rename fractions as decimals as necessary.

1.

   A 0.33 B 1.6 C 0.7 D 1.01
   E 1.99 F 1.33 G 0.1 H 0.8

2. 

   I 0.67 J 0.05 K $\frac{75}{100}$ L 0.49 M 0.99
   N 1.15 O $\frac{25}{100}$ P 0.101 Q 0.55 R 0.88

Use decimals. Write 3 numbers that are between the following: Sample answers:

3. $5 and $6	$ 5.05	$ 5.25	$ 5.95
4. 4 centimeters and 5 centimeters	4.15 cm	4.5 cm	4.99 cm
5. 21 seconds and 22 seconds	21.4 sec	21.98 sec	21.57 sec
6. 8 dimes and 9 dimes	$ 0.89	$ 0.85	$ 0.82
7. 2.15 meters and 2.17 meters	2.155 m	2.16 m	2.159 m
8. 0.8 meter and 0.9 meter	0.84 m	0.88 m	0.87 m

Practice

9. x + 17 = 23 x = 6 10. 5 * n = 35 n = 7 11. 32 / b = 4 b = 8

Math Masters, p. 112

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ENRICHMENT

PARTNER ACTIVITY

Writing Decimal Riddles

15–30 Min

Literature Link To apply students' understanding of decimal concepts, have them write and solve decimal riddles similar to the one on journal page 83. The following books are good sources for riddles:

Portfolio Ideas

- ***The Everything Kids' Joke Book: Side-Splitting, Rib-Tickling Fun*** (Everything Kids Series) by Michael Dahl (Adams Media Corporation, 1992)
- ***Kids' Funniest Jokes,*** edited by Sheila Anne Barry (Sterling Publishing Co., 1993)

EXTRA PRACTICE

SMALL-GROUP ACTIVITY

5-Minute Math

5–15 Min

To offer students more experience with decimals, see *5-Minute Math,* pages 14, 89, and 94.

ELL SUPPORT

SMALL-GROUP ACTIVITY

Creating a Decimals All Around Museum

15–30 Min

(*Differentiation Handbook*)

To provide language support for decimals, have students create a Decimals All Around Museum. See the *Differentiation Handbook* for additional information.

Ask students to read the numbers and describe some of the ways that decimals are used in the museum; for example, what the numbers mean, the different categories of uses, or the units attached to the decimals.

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Date Time

LESSON 4•3

Comparing Decimals

back to lesson

Math Message

SRB 32 33

1. Arjun thought that 0.3 was less than 0.15. Explain or draw pictures to help Arjun see that 0.3 is more than 0.15.

2. Use base-10 blocks to complete the following table.

"<" means "is less than."

">" means "is greater than."

Base-10 Blocks	Decimal	>, <, or =	Decimal	Base-10 Blocks
	0.2	>	0.12	
			0.1	
	0.13			
			0.3	
	1.2			
			0.39	
	2.3			

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Date Time

LESSON 4•3

Ordering Decimals

back to lesson

1. Write < or >.

a. 0.24 _____ 0.18 **b.** 0.05 _____ 0.1 **c.** 0.2 _____ 0.35

d. 1.03 _____ 0.30 **e.** 3.2 _____ 6.59 **f.** 25.9 _____ 25.72

2. Write your own decimals to make true number sentences.

a. _____ > _____ **b.** _____ < _____ **c.** _____ < _____

3. Put these numbers in order from smallest to largest.

a. 0.05, 0.5, 0.55, 5.5 _____ _____ _____ _____
smallest largest

b. 0.99, 0.27, 1.8, 2.01 _____ _____ _____ _____
smallest largest

c. 2.1, 2.01, 20.1, 20.01 _____ _____ _____ _____
smallest largest

d. 0.01, 0.10, 0.11, 0.09 _____ _____ _____ _____
smallest largest

4. Write your own decimals in order from smallest to largest.

_____ _____ _____ _____
smallest largest

5. "What's green inside, white outside, and hops?"
To find the answer, put the numbers in order from smallest to largest.

0.66	1	0.2	1.05	0.90	0.01	0.75	0.35	$\frac{25}{100}$	$\frac{50}{100}$	0.05	0.09	5.5
N	I	O	C	W	A	D	S	G	A	F	R	H

Write your answers in the following table. The first answer is done for you.

0.01												
A												

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Date Time

LESSON 4•3

Math Boxes

back to lesson

1. Solve mentally.

a. 5 * _____ = 40

b. 9 * 9 = _____

c. 9 * _____ = 27

d. 42 ÷ 6 = _____

e. 54 ÷ 9 = _____

f. 63 ÷ 7 = _____

SRB 16 20

2. Solve each open sentence.

a. 100 + w = 175 w = _____

b. 503 + y = 642 y = _____

c. p + 263 = 319 p = _____

d. 444 − s = 93 s = _____

e. r − 320 = 600 r _____

SRB 148

3. In 34.561

a. The 3 is worth _____.

b. The 4 is worth _____.

c. The 5 is worth _____.

d. The 6 is worth _____.

e. The 1 is worth _____.

SRB 30 31

4. Draw and label ray *CT*.
Draw point *A* on it.

SRB 91

5. Insert parentheses to make these number sentences true.

a. 7 * 8 − 6 = 50

b. 13 − 4 * 6 = 54

c. 10 = 3 + 49 / 7

d. 28 = 28 − 6 + 42 / 7

SRB 150

6. Estimate the sum. Write a number model to show how you estimated.

3,005 + 9,865 + 2,109

Number model: _____

_____

_____

SRB 181

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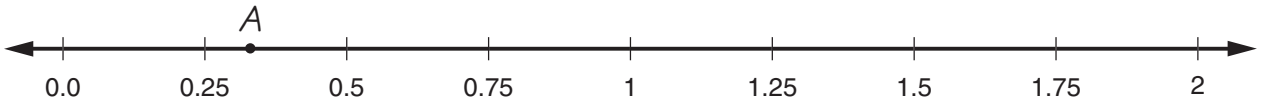
Name Date Time

STUDY LINK 4•3

Ordering Decimals

Mark the approximate locations of the decimals and fractions on the number lines below. Rename fractions as decimals as necessary.

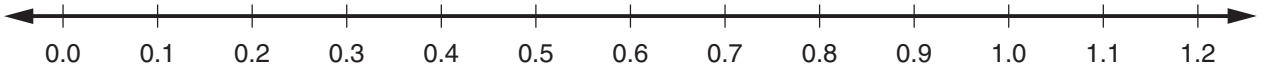
1.



A 0.33 *B* 1.6 *C* 0.7 *D* 1.01

E 1.99 *F* 1.33 *G* 0.1 *H* 0.8

2.



I 0.67 *J* 0.05 *K* $\frac{75}{100}$ *L* 0.49 *M* 0.99

N 1.15 *O* $\frac{25}{100}$ *P* 0.101 *Q* 0.55 *R* 0.88

Use decimals. Write 3 numbers that are between the following:

3. \$5 and \$6 \$_____ \$_____ \$_____

4. 4 centimeters and 5 centimeters _____ cm _____ cm _____ cm

5. 21 seconds and 22 seconds _____ sec _____ sec _____ sec

6. 8 dimes and 9 dimes \$_____ \$_____ \$_____

7. 2.15 meters and 2.17 meters _____ m _____ m _____ m

8. 0.8 meter and 0.9 meter _____ m _____ m _____ m

Practice

9. $x + 17 = 23$ $x =$ _____ **10.** $5 * n = 35$ $n =$ _____ **11.** $32 / b = 4$ $b =$ _____

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Name Date Time

Coin Cards

back to lesson

	N N P P P P	D D N P P	Q D P P P P
Q D N P P P	Q D D P P P		
Q Q D N P P	Q Q D D P	Q Q Q P P P	Q Q Q N P P P
Q Q Q D N P	Q Q Q D D P	Q Q Q D D N	Q Q Q Q D P P

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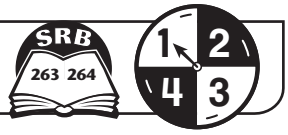
back to lesson

Name Date Time

Top-It Record Sheet



Play a round of *Top-It.* Record your number sentence and your opponent's number sentence. Write >, <, or = to compare the number sentences.

Round	Player 1	>, <, =	Player 2
Sample	$4 + 6 = 10$	<	$8 + 3 = 11$
1			
2			
3			
4			
5			

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Name Date Time

Top-It Record Sheet

Play a round of *Top-It.* Record your number sentence and your opponent's number sentence. Write >, <, or = to compare the number sentences.

Round	Player 1	>, <, =	Player 2
Sample	$4 + 6 = 10$	<	$8 + 3 = 11$
1			
2			
3			
4			
5			

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Basic Multiplication Facts

The symbols × and ∗ are both used to indicate multiplication. In this book, the symbol ∗ is used most often.

A basic multiplication fact is a product of two one-digit factors.

8 ∗ 5 = 40 is a basic fact. If you don't remember a basic fact, try one of the following methods:

Use Counters or Draw a Picture

To find 8 ∗ 5, make 8 groups of counters with 5 counters in each group, or draw a simple picture to show 8 groups of 5 objects. Then count all the objects.

Skip Count Up

To find 8 ∗ 5, count up by 5s, 8 times:
5, 10, 15, 20, 25, 30, 35, 40.
Use your fingers to keep track as you skip count.

Use Known Facts

The answer to a 4s fact can be found by doubling, then doubling again. For example, to find 4 ∗ 7, double 7 to get 14. Then double 14 to get 28.

The answer to an 8s fact can be found by doubling three times. For example, to find 8 ∗ 6, double 6 to get 12. Double again to get 24. And then double a third time to get 48.

The answer to a 6s fact can be found by using a related 5s fact. For example, 6 ∗ 8 is equal to 8 more than 5 ∗ 8.
6 ∗ 8 = 5 ∗ 8 + 8 = 40 + 8, or 48.

There is a **pattern** to the 9s facts:

- The 10s digit in the product is 1 less than the digit that is multiplying the 9.

  For example, in 9 ∗ 3 = 27, the 2 in 27 is 1 less than the 3 in 9 ∗ 3.

  In 9 ∗ 7 = 63, the 6 in 63 is 1 less than the 7 in 9 ∗ 7.

- The sum of the digits in the product is 9.

  For example, in 9 ∗ 3 = 27, 2 + 7 = 9.

  In 9 ∗ 7 = 63, 6 + 3 = 9.

4s Facts

Double and then double again.

8s Facts

Double 3 times.

9s Facts

9 ∗ 1 = 9
9 ∗ 2 = 18
9 ∗ 3 = 27
9 ∗ 4 = 36
9 ∗ 5 = 45
9 ∗ 6 = 54
9 ∗ 7 = 63
9 ∗ 8 = 72
9 ∗ 9 = 81

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Basic Division Facts

A division fact can represent sharing equally or forming equal groups.

Sharing equally:

35 / 5 = ? 5 people share 35 pennies.
How many pennies does each person get? 7

Forming equal groups:

35 / 5 = ? There are 35 oranges in all.
5 oranges are put into each bag.
How many bags can be filled? 7

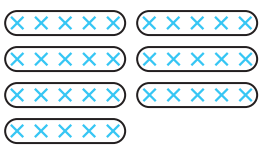
If you don't remember a basic fact, try one of the following methods:

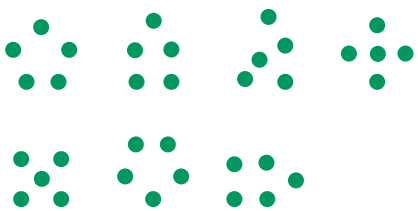
Use Counters or Draw a Picture

To find 35 / 5, start with 35 objects.

Think: How many 5s in 35?

Make or circle groups of 5 objects each. Count the groups.





Skip Count Down

To find 35 / 5, start at 35 and count by 5s down to 0. Use your fingers to keep track as you skip count.

35, 30, 25, 20, 15, 10, 5, 0. That's 7 skips.

Use Known Multiplication Facts

Every division fact is related to a multiplication fact. For example, if you know that $5 * 7 = 35$ or $7 * 5 = 35$, you can figure out that $35 / 5 = 7$ and $35 / 7 = 5$.

Note

You can multiply by 0, but you cannot divide by 0. For example, $0 * 9 = 0$ and $9 * 0 = 0$, but 9 / 0 has no answer.

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Comparing Decimals

One way to compare decimals is to model them with base-10 blocks. The flat is usually the whole, or ONE.

Example Compare 0.27 and 0.3.

0.27 0.3

2 longs and 7 cubes are less than 3 longs.

So, 0.27 is less than 0.3. $0.27 < 0.3$

For the examples on this page:

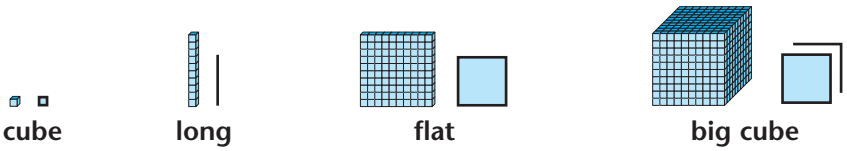
A flat is worth 1.

A long is worth 0.1.

A cube is worth 0.01.

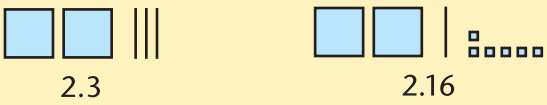
Another way to compare decimals is to draw pictures of base-10 blocks.

Base-10 Blocks and Their Shorthand Pictures



cube long flat big cube

Example Compare 2.3 and 2.16.



2.3 2.16

2 flats and 3 longs are more than 2 flats, 1 long, and 6 cubes.

So, 2.3 is more than 2.16. $2.3 > 2.16$

A flat is worth 1.

A long is worth 0.1.

A cube is worth 0.01.

In the next example, the big cube is the whole, or ONE.

Example Compare 2.13 and 2.073.

2.13 2.073

Each picture shows 2 big cubes.
1 flat and 3 longs are more than 7 longs and 3 cubes.

So, 2.13 is more than 2.073. $2.13 > 2.073$

A big cube is worth 1.

A flat is worth 0.1.

A long is worth 0.01.

A cube is worth 0.001.

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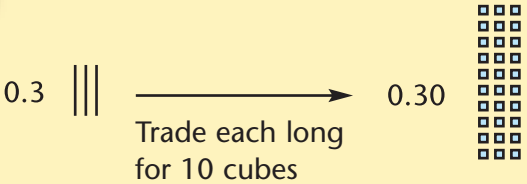
You can write a 0 at the end of a decimal without changing the value of the decimal: 0.7 = 0.70. Attaching 0s is sometimes called "padding with 0s." Think of it as trading for smaller pieces.

Example 0.3 = 0.30



For the examples on this page:

A flat is worth 1.

A long is worth 0.1.

A cube is worth 0.01.

Padding with 0s makes comparing decimals easier.

Examples

Compare 0.2 and 0.05.

0.2 = 0.20 (Trade 2 longs for 20 cubes.)
20 cubes are more than 5 cubes.
20 hundredths is more than 5 hundredths.

0.20 > 0.05, so 0.2 > 0.05.

Compare 0.99 and 1.

1 = 1.00 (Trade 1 flat for 100 cubes.)
99 cubes are less than 100 cubes.
99 hundredths is less than 100 hundredths.

0.99 < 1.00, so 0.99 < 1

A place-value chart can also be used to compare decimals.

Example Compare 3.915 and 3.972.

1s ones	.	0.1s tenths	0.01s hundredths	0.001s thousandths
3	.	9	1	5
3	.	9	7	2

The ones digits *are the same.* They are both worth 3.
The tenths digits *are the same.* They are both worth 9 tenths, or 0.9.

The hundredths digits are *not the same.* The 1 is worth 1 hundredth, or 0.01.
The 7 is worth 7 hundredths, or 0.07. The 7 is worth more than the 1.

So, 3.915 is less than 3.972. 3.915 < 3.972

Check Your Understanding

Compare the numbers in each pair.

1. 0.68, 0.2 **2.** 5.39, 5.5 **3.** $\frac{1}{2}$, 0.51 **4.** 0.999, 1.1

Check your answers on page 341.

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Product Pile-Up

Materials ☐ number cards 1–10 (8 of each)

Players 3 to 5

Skill Multiplication facts 1 to 10

Object of the game To play all of your cards and have none left.

Directions

1. Shuffle the cards and deal 12 cards to each player. Place the rest of the deck number-side down on the table.
2. The player to the left of the dealer begins. This player selects 2 of their cards, places them number-side up on the table, multiplies the numbers, and gives the product.
3. Play continues with each player selecting and playing 2 cards with a product that is *greater than* the product of the last 2 cards played.

Example Joe plays 3 and 6 and says, "3 times 6 equals 18."

The next player, Rachel, looks at her hand to find 2 cards with a product higher than 18. She plays 5 and 4 and says, "5 times 4 equals 20."

4. If a player is not able to play 2 cards with a greater product, the player must draw 2 cards from the deck. These 2 cards are added to the player's hand. If the player is now able to make a greater product, the 2 cards are played, and play continues.
5. If after drawing the 2 cards a player still cannot make a play, the player says "Pass." If all the other players say "Pass," the last player who was able to lay down 2 cards starts play again. That player may select any 2 cards to make *any* product and play continues.
6. If a player states an incorrect product, he or she must take back the 2 cards, draw 2 cards from the deck, and say "Pass." Play moves to the next person.
7. The winner is the first player to run out of cards, or the player with the fewest cards when there are no more cards to draw.

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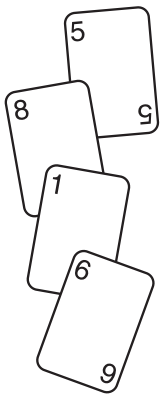
Top-It Games

The materials, number of players, and object of the game are the same for all *Top-It Games*.



Materials ☐ number cards 1–10 (4 of each)
☐ 1 calculator (optional)

Players 2 to 4

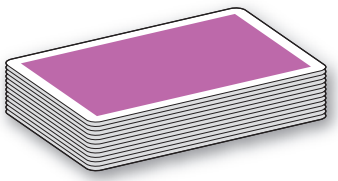
Skill Addition, subtraction, multiplication, and division facts

Object of the game To collect the most cards.

Addition Top-It

Directions

1. Shuffle the cards and place the deck number-side down on the table.
2. Each player turns over 2 cards and calls out the sum of the numbers. The player with the largest sum takes all the cards. In case of a tie for the largest sum, each tied player turns over 2 more cards and calls out the sum of the numbers. The player with the largest sum takes all the cards from both plays.



3. Check answers using an Addition Table or a calculator.
4. The game ends when there are not enough cards left for each player to have another turn.
5. The player with the most cards wins.

Variation Each player turns over 3 cards and finds their sum.

Advanced Version Use only the number cards 1–9. Each player turns over 4 cards, forms two 2-digit numbers, and finds the sum. Players should carefully consider how they form their numbers since different arrangements have different sums. For example, 74 + 52 has a greater sum than 47 + 25.

Subtraction Top-It

Directions

1. Each player turns over 3 cards, finds the sum of any 2 of the numbers, then finds the difference between the sum and the third number.
2. The player with the largest difference takes all the cards.

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Example A 4, an 8, and a 3 are turned over. There are three ways to form the numbers. Always subtract the smaller number from the larger one.

$4 + 8 = 12$	$3 + 8 = 11$	$3 + 4 = 7$
$12 - 3 = 9$	$11 - 4 = 7$	$8 - 7 = 1$

Advanced Version Use only the number cards 1–9. Each player turns over 4 cards, forms two 2-digit numbers, and finds their difference. Players should carefully consider how they form their numbers. For example, $75 - 24$ has a greater difference than $57 - 42$ or $74 - 25$.

Multiplication Top-It

Directions

1. The rules are the same as for *Addition Top-It,* except that players find the product of the numbers instead of the sum.
2. The player with the largest product takes all the cards. Answers can be checked with a Multiplication Table or a calculator.

Variation Use only the number cards 1–9. Each player turns over 3 cards, forms a 2-digit number, then multiplies the 2-digit number by the remaining number.

Division Top-It

Directions

1. Use only the number cards 1–9. Each player turns over 3 cards and uses them to generate a division problem as follows:
   - Choose 2 cards to form the dividend.
   - Use the remaining card as the divisor.
   - Divide and drop any remainder.

The player with the largest quotient takes all the cards.

Advanced Version Use only the number cards 1–9. Each player turns over 4 cards, chooses 3 of them to form a 3-digit number, then divides the 3-digit number by the remaining number. Players should carefully consider how they form their 3-digit numbers. For example, $462 / 5$ is greater than $256 / 4$.

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Decimal Place Value

Set up: Write the numbers 2.54, 1.3, 0.56, 1.23, 0.09, 2.67, and 0.1 on the board. Also draw the following example:

Students need slates or paper.

1. **Use large squares, line segments, and small squares to show each of the numbers given on the board.**
   The large square stands for the base-10 *flat* and represents 1 whole; the line stands for a *long*, which is $\frac{1}{10}$ of the flat; and the small square stands for the *small cube*, which is $\frac{1}{100}$ of the flat.

2. **Now put these numbers in order from smallest to largest.** (0.09, 0.1, 0.56, 1.23, 1.3, 2.54, 2.67)

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Decimal Place Value

Set up: Draw the first chart on the board. While students are working on the first chart, you can draw the second chart on the board. Students need slates or paper.

1. **Copy this chart and fill in the missing amounts.**

	The Number 0.1 More	The Number 100 Times More
1.20	(1.30)	(120)
201.00	(201.10)	(20,100)
77.010	(77.110)	(7,701.0)

2. **Now let's complete this one.**

	The Number 10 Times Less	The Number 100 Times Less
50.37	(5.037)	(0.5037)
29.344	(2.9344)	(0.29344)
6.04	(0.604)	(0.0604)

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Decimal Place Value

Set up: Write the following numbers on the board in a column: 12,345; 1,234.5; 123.45; 12.345; 1.2345.

1. **Use expanded notation to show the place value of each digit in the numbers shown on the board. Let's do one together.** (Example: $1{,}234.5 = 1{,}000 + 200 + 30 + 4 + \frac{5}{10}$)

2. **Write the name for each of the numbers in words. Let's do one together.** (Example: 1,234.5 is written "one thousand two hundred thirty-four and five tenths.")

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