

# Chapter 4 – Decimals

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# Introduction to Decimals

Name \_\_\_\_\_

## Place Value

1. Write the place value for each digit in words.

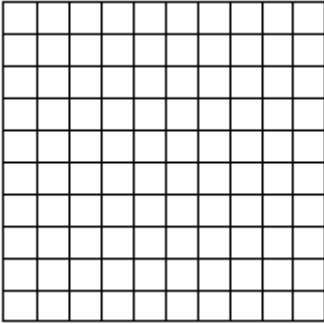
<b>7</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>

2. Complete the Table. The place value name is the equivalent fraction.

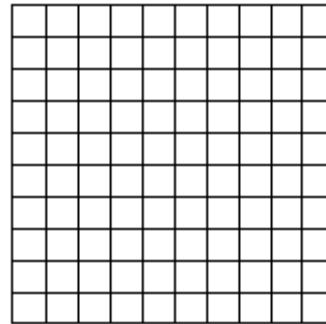
<b>Decimal</b>	<b>Place Value Name</b>	<b>Fraction</b>
0.1	One tenth	$\frac{1}{10}$
0.24	Twenty-four hundredths	$\frac{24}{100} = \frac{6}{25}$
0.5		
12.005		
0.024		
2.012		
1.05		

3. Shade an area to represent each decimal. Then write the equivalent fraction.

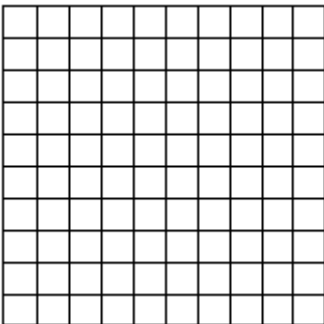
0.5



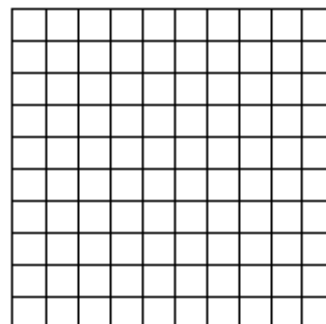
0.13



0.4



0.29



4. List the decimals from smallest to largest

0.1, 1.1, 0.01                    \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

0.05, 0.5, 0.55                    \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

0.13, 0.09, 1.2                    \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

0.24, 0.03, 0.07                    \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_

5. The top six finishers in the women's individual all-around gymnastic competition in the Beijing Olympic Games are shown below in alphabetical order. If the highest score wins, which gymnasts won gold (1st place), silver (2nd place), and bronze (3rd place)?

<b>Name</b>	<b>Nation</b>	<b>Score</b>
Yuyuan Jiang	China	60.900
Shawn Johnson	U.S.A.	62.725
Nastia Liukin	U.S.A.	63.325
Steliana Nistor	Romania	61.050
Ksenia Semenova	Russia	61.925
Yilin Yang	China	62.650

6. Place a < or > symbol in the box to make a true statement.

a.  $0.5 \square 0.55$

b.  $0.1 \square 0.01$

c.  $7.22 \square 7.19$

d.  $6.60 \square 6.601$

e.  $0.05 \square 0.005$

f.  $2.9432 \square 2.9433$

**Standard and Abbreviated Form**

7. Write the following in standard form (as a number).

a. 12.5 million \_\_\_\_\_

b. 1.33 billion \_\_\_\_\_

8. Write in abbreviated form (as in #7).

a. 2,600,000,000 \_\_\_\_\_

b. 18,400,000 \_\_\_\_\_

**Rounding**

9. Round 126.3918 to the nearest:

Tenth: \_\_\_\_\_ Whole number: \_\_\_\_\_

Hundred: \_\_\_\_\_ Thousandth: \_\_\_\_\_

10. Round 5,591.52199 to the nearest:

Tenth: \_\_\_\_\_ Whole number: \_\_\_\_\_

Hundred: \_\_\_\_\_ Ten-thousandth: \_\_\_\_\_

11. The metric system is widely used in science to measure length (meters), weight (grams), and capacity (liters). Round each decimal to the nearest hundredth.

1 foot is 0.3048 meters. \_\_\_\_\_

1 mile is 1,609.344 meters. \_\_\_\_\_

1 pound is 453.59237 grams. \_\_\_\_\_

1 gallon is 3.785306 liters. \_\_\_\_\_

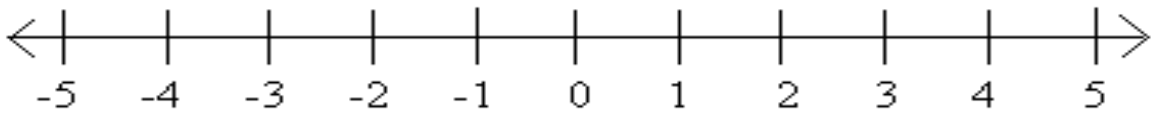
12. Round each dollar amount to the nearest cent.

\$35,673.732 \_\_\_\_\_

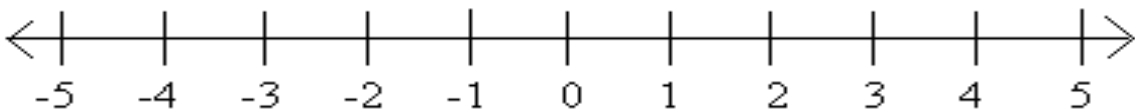
\$7,134.296 \_\_\_\_\_

13. Graph the following numbers on a number line

a.  $-3.1, -1.25, 0, 2.3, 3.75$



b.  $1.4, -1.9, 0.6, -3.1, -0.1$












### Place Value and Powers of Ten

Fill in the blanks below. What do you notice about the numbers in this table?

one millions   
 hundred thousands   
 ten thousands   
 one thousands   
 hundreds   
 tens   
 ones   
 tenths   
 hundredths   
 thousandths   
 ten thousandths   
 hundred thousandths   
 millionths

9 , 6 0 5 , 8 7 2 . 1 4 5 6 7 3

Decimal	Fraction	Power	Place Value Name	
100,000	100,000	$10^5$	hundred thousands	
10,000	10,000	$10^4$	ten thousands	
1000	1000	$10^3$	thousands	
100	100	$10^2$	hundreds	
10	10	$10^1$	tens	
1	1	$10^0$	ones	
0.1	$\frac{1}{10}$	$10^{-1}$	_____	
0.01	_____	$10^{-2}$	hundredths	
_____	$\frac{1}{1000}$	$10^{-3}$	thousandths	
_____	_____	$10^{-4}$	_____	

## Adding and Subtracting Decimals Menu Activity

Name \_\_\_\_\_

Use the PCC Café menu and receipt to answer the questions below. Show all of your steps.

1. If you ordered the lettuce wrap gluten-free burger, PCC Café house salad, and Ice tea, how much would you pay?
2. How much more do the Vietnamese salad rolls cost than the soup of the day?
3. If you paid for a veggie wrap with a \$20 bill, how much change would you get back?
4. What is fewest numbers of bills and coins you could use to pay for a turkey, bacon, lettuce and tomato sandwich? Which bills and coins would you use?
5. Look at your receipt. If you paid with a \$20 bill and added \$0.75 to the tip jar, how much would you have left?
6. Look at your receipt. What would the total price be if you had ordered the New York cheesecake instead of the soda pop?

**What would you like to see at the PCC Café?** Brainstorm with your group to create at least five menu items with prices. Write three math questions to go with your menu. Then, trade your menu with another group and answer their questions.

Item	Price
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Write three challenging math questions to go with your menu. You will be trading these with another group to solve.

1.

2.

3.





# Menu

## Starters

PCC Café house salad.....	\$2.00
Soup of the day.....	\$2.20
Vietnamese salad rolls (3 rolls).....	\$3.00
Fish or shrimp tacos (2 tacos).....	\$2.50

## Burgers

PCC Café house burger .....	\$4.50
Mushroom, bacon, onion, and Swiss cheese burger .....	\$5.00
All beef patty, BBQ sauce, and red onion burger .....	\$5.50
Lettuce wrap gluten-free burger .....	\$4.75

## Sandwiches

PCC Café house sandwich .....	\$4.00
Grilled chicken sandwich with BBQ sauce .....	\$5.00
Turkey, bacon, lettuce and tomato sandwich .....	\$5.95
Veggie wrap gluten-free .....	\$3.75

## Desserts/Drinks

New York cheesecake .....	\$1.99/slice
Fresh apple pie .....	\$1.70/slice
Cherry pie .....	\$1.60/slice
Soda pop.....	\$0.75
Ice tea .....	\$1.20
Coffee.....	\$0.50



## Receipt

1 PCC Café house salad	\$2.00
1 Soup of the day	\$2.20
1 Mushroom, bacon, onion and Swiss cheese burger	\$5.00
1 Soda pop	\$0.75
<b>Total:</b>	<b>\$ 9.95</b>

## Adding and Subtracting Decimals Practice

Name \_\_\_\_\_

1. Without using a calculator, determine the sign of each result. Do not find the actual result.

a.  $2.41 - 8.09$  positive / negative

b.  $-10.3 + 1.99$  positive / negative

c.  $-3.9 - (-6.2)$  positive / negative

d.  $-18.55 - 0.7$  positive / negative

e.  $-2.13 + (-1.79)$  positive / negative

f.  $-7.5 - (-2.1)$  positive / negative

Solve the problem and show your steps. Write your answer as a complete sentence.

2. The world record for the 100 meter backstroke is 52.5 seconds. Your current time is 59.235 seconds. How much do you need to shave off of your time to beat the world record?

3. News Report: "German bobsledders set a world record today with a final run of 53.03 seconds, finishing ahead of the Italian team by only fourteen thousandths of a second." What was the time for the Italian bobsled team?

## Multiplying Decimals Practice

Name \_\_\_\_\_

Multiply the given decimals.

$$\begin{array}{r} 1. \quad 63 \\ \times 0.5 \\ \hline \end{array}$$

$$\begin{array}{r} 2. \quad 0.47 \\ \times 0.2 \\ \hline \end{array}$$

$$\begin{array}{r} 3. \quad 5.621 \\ \times 0.93 \\ \hline \end{array}$$

## Powers of Ten

$$\begin{array}{r} 0.1234 \\ \times 10 \\ \hline \end{array}$$

$$\begin{array}{r} 0.1234 \\ \times 100 \\ \hline \end{array}$$

$$\begin{array}{r} 0.1234 \\ \times 1000 \\ \hline \end{array}$$

$$\begin{array}{r} 0.1234 \\ \times 0.1 \\ \hline \end{array}$$

$$\begin{array}{r} 0.1234 \\ \times 0.01 \\ \hline \end{array}$$

$$\begin{array}{r} 0.1234 \\ \times 0.001 \\ \hline \end{array}$$

**What do you notice multiplying decimals by powers of 10?**

# Multiplying Decimals Game – Connect Five

Name \_\_\_\_\_

## Directions

- Find a partner and take turns tossing two dice. For each die you roll, use the factor listed in the table.

Dice Roll	1	2	3	4	5	6
Factor	1	0.2	0.03	4	0.5	0.06

- Multiply your two factors. Then find the product on the chart below.
- One partner will mark the game board with an X and the other partner will mark with an O. You may mark a box that your partner has already marked.
- The winner is the first one to mark five boxes in a row across, down, or diagonally.

1. Before playing make a prediction. What roll is going to give you the largest product? What roll will give you the smallest product? Now that you have made a prediction, you can play the game.

0.0018	FREE	0.03	0.006	0.8
0.2	4	0.24	0.1	FREE
16	0.0009	0.012	FREE	0.04
0.0036	1	FREE	0.06	0.5
FREE	0.25	2	0.015	0.12

2. Which two factors created the largest product? Which two created the smallest product?

3. Did you come up with a method to multiply the decimals quickly? If so, describe it.

4. Now, use that method to find the answer for  $0.004 \times 0.07$ .

**Decimal Dividends and Whole Number Divisors**

- 1) Do long division as if there were no decimal point. You can write extra zeros after the last digit in the dividend and keep dividing until there is no remainder.
- 2) Place the decimal point in the answer directly above the decimal point in the problem.
- 3) Divide, writing as many extra zeros as you need after the last digit in the dividend. Place the decimal point in the quotient directly above the new decimal point in the dividend.

1. Divide.

$$3 \overline{)0.48}$$

$$5 \overline{)2.46}$$

$$12 \overline{)6.84}$$

**Decimal Divisors**

- 1) Move the decimal point in the divisor to the right until the divisor is a whole number.
- 2) Move the decimal point in the dividend to the right the same number of places that you moved the decimal point in the divisor.
- 3) Divide, writing as many extra zeros as you need after the last digit in the dividend. Place the decimal point in the quotient directly above the new decimal point in the dividend.

2. Divide.

$$0.07 \overline{)21}$$

$$0.15 \overline{)0.327}$$

$$3.6 \overline{)148.86}$$

### Repeating Decimals

3. Divide and write the answer both as a repeating decimal and rounded to the nearest hundredth

$$0.2 \overline{)3}$$

$$0.11 \overline{)38}$$

### Powers of Ten

4. Divide.

$$10 \overline{)0.1234}$$

$$100 \overline{)0.1234}$$

$$1000 \overline{)0.1234}$$

$$0.1 \overline{)0.1234}$$

$$0.01 \overline{)0.1234}$$

$$0.001 \overline{)0.1234}$$

What do you notice about dividing decimals by powers of ten?

1. Without using a calculator, determine the sign of each result. Do not find the actual result.

a.  $4.5 - 7.82$  positive / negative

b.  $-5.1 + 2.79$  positive / negative

c.  $3.9(-6.2)$  positive / negative

d.  $-18.55 \div 0.7$  positive / negative

e.  $-0.56 + (-3.9)$  positive / negative

f.  $-7.5(-2.1)$  positive / negative

2. Use the order of operations with proper formatting to simplify the expression. Do your calculations on the side.

a.  $0.2 + 3(1.5)$

b.  $10.5 - [3.25 + (0.5)^2]$

Solve the problem and show your steps. Write your answer as a complete sentence.

3. Each month, a salesperson is reimbursed by for work-related travel in their own car at a rate of \$0.445 per mile. How much will the salesperson receive if they traveled 120 miles per week for four weeks?

4. A gas company taxes the number of therms used each month by a customer in addition to a flat tax of \$2.31 . What are the taxes collected on a monthly usage of 31 therms if the tax rate is \$0.00566 per therm? Round your answer to the nearest cent.

5. Your grade point average (GPA) is a weighted average where each letter grade has a numerical value (A = 4, B = 3, C = 2, D = 1, F = 0) and the *weights* are the number of credits that each course is worth.

Find the grade point average for the courses listed. Round to the nearest hundredth.

Course	Credits	Grade	Grade Value	Grade Points = Credits × Grade Value
Math	4	B	_____	_____
English	4	C	_____	_____
Psychology	3	A	_____	_____
P.E.	2	A	_____	_____
TOTAL	_____			_____

6. Find the average of the following numbers: 4.66 , 7.2 , 5.123 , 8.9 , 6.63 , 6.239 , 4.9 , 5.04



## Fractions and Decimals

Name \_\_\_\_\_

1. Write the decimal in fraction form.

a. 0.7

b. 0.77

c. 0.07

2. Use long division to write the fraction as a decimal.

a.  $\frac{5}{8}$

b.  $\frac{7}{5}$

c.  $\frac{4}{9}$

d.  $\frac{5}{12}$

e.  $\frac{10}{3}$

f.  $\frac{2}{15}$

3. Use your answers from problem 2 to place an  $<$ ,  $>$ , or  $=$  symbol in the box to make a true statement.

a.  $\frac{5}{8}$   0.7

b.  $\frac{4}{9}$   0.4

c.  $\frac{5}{12}$   0.42

d.  $\frac{2}{5}$   0.4

e.  $\frac{3}{4}$   0.75

f.  $\frac{2}{15}$   0.13

4. Write the numbers in order from smallest to largest.  $7\frac{3}{8}$ , 7.08,  $\frac{43}{6}$

5. Convert the decimal to a fraction, then perform the indicated operation.

a.  $\frac{2}{3} + 0.2$

b.  $0.9 - \frac{5}{6}$

c.  $0.25 \left( \frac{2}{5} \right)$

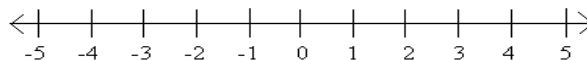
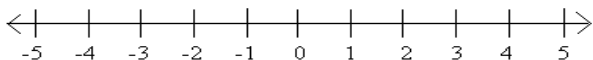
d.  $\frac{7}{8} \div 0.1$

6. Explain the difference between the decimal number  $0.8$  and the decimal number  $0.\overline{8}$ .

7. Graph the following numbers on a number line

a.  $-3, -1.25, 0, \frac{1}{2}, 4\frac{3}{4}$

b.  $2\frac{7}{8}, 1.\overline{4}, -4.25, -\frac{3}{5}$



8. Write the exact decimal equivalent to each fraction.

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

$$\frac{1}{3} =$$

$$\frac{2}{3} =$$

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

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

$$\frac{3}{4} =$$

$$\frac{2}{5} =$$

$$\frac{3}{5} =$$

$$\frac{4}{5} =$$

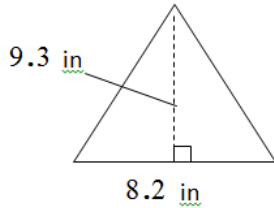
$$\frac{1}{8} =$$

$$\frac{1}{10} =$$

$$\frac{3}{10} =$$

If a problem includes a mixture of fractions and decimals, you'll probably want to rewrite it so there are either fractions or decimals, but not both. When a fraction would convert to a repeating decimal, stick with fractions.

9. Find the area of the triangle shown using the formula  $\text{Area} = \frac{1}{2} \cdot \text{base} \cdot \text{height}$ .



10. Use the order of operations to simplify each expression.

a.  $\frac{2}{5}(4 - 1.75)$

b.  $\frac{2}{3}(0.15)^2$

c.  $1 + 0.39 \div \frac{3}{100}$

d.  $5000(0.09)\left(\frac{5}{12}\right)$

11. According to MapQuest, my round-trip commute to Fullerton College is 45.89 miles. If my car gets 17.9 miles per gallon of gas, how many gallons of gas will I use for one round-trip? (Round your answer to the nearest tenth of a gallon.) Now, if the price of gas is  $\$3.63\frac{9}{10}$  per gallon, how much will one round-trip cost me? (Write the answer in dollars and cents, rounded to the nearest cent.)

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
<b>1</b>	1	2	3	4	5	6	7	8	9	10	11	12
<b>2</b>	2	4	6	8	10	12	14	16	18	20	22	24
<b>3</b>	3	6	9	12	15	18	21	24	27	30	33	36
<b>4</b>	4	8	12	16	20	24	28	32	36	40	44	48
<b>5</b>	5	10	15	20	25	30	35	40	45	50	55	60
<b>6</b>	6	12	18	24	30	36	42	48	54	60	66	72
<b>7</b>	7	14	21	28	35	42	49	56	63	70	77	84
<b>8</b>	8	16	24	32	40	48	56	64	72	80	88	96
<b>9</b>	9	18	27	36	45	54	63	72	81	90	99	108
<b>10</b>	10	20	30	40	50	60	70	80	90	100	110	120
<b>11</b>	11	22	33	44	55	66	77	88	99	110	121	132
<b>12</b>	12	24	36	48	60	72	84	96	108	120	132	144

1. What is special about the numbers in the diagonal of the multiplication chart?

2. Complete the square roots using the examples provided.

$$\boxed{3}^2 = 9 \text{ so } \sqrt{9} = \boxed{3}$$

$$\left(\frac{\boxed{2}}{\boxed{5}}\right)^2 = \frac{2}{5} \cdot \frac{2}{5} = \frac{4}{25} \text{ so } \sqrt{\frac{4}{25}} = \frac{\boxed{2}}{\boxed{5}}$$

$$\boxed{\phantom{00}}^2 = 16 \text{ so } \sqrt{16} = \boxed{\phantom{00}}$$

$$\left(\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}\right)^2 = \frac{81}{64} \text{ so } \sqrt{\frac{81}{64}} = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$$

$$\boxed{\phantom{00}}^2 = 49 \text{ so } \sqrt{49} = \boxed{\phantom{00}}$$

$$\left(\frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}\right)^2 = \frac{1}{121} \text{ so } \sqrt{\frac{1}{121}} = \frac{\boxed{\phantom{00}}}{\boxed{\phantom{00}}}$$

3. Simplify the square roots.

$$\sqrt{81}$$

$$\sqrt{100}$$

$$-\sqrt{36}$$

$$\sqrt{\frac{144}{49}}$$