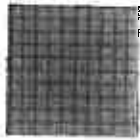


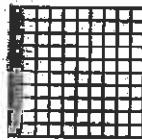
Name _____

Decimals

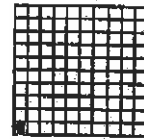
A **decimal** is a number that includes a period called a **decimal point**. The digits to the right of the decimal point are a value less than one.



one whole



one tenth



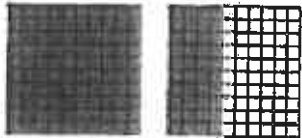
one hundredth

The place value chart below helps explain decimals.

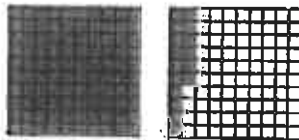
hundreds	tens	ones	tenths	hundredths	thousandths
6	3	2	. 4		
	4	7	. 0	5	
		8	. 0	0	9

A decimal point is read as "and." The first number, 632.4, is read as "six hundred thirty-two and four tenths." The second number, 47.05, is read as "forty-seven and five hundredths." The third number, 8.009, is read as "eight and nine thousandths."

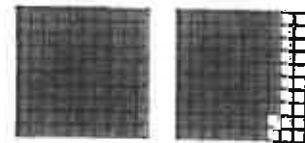
Directions: Write the decimals shown below. Two have been done for you.



1. 1.4



2. _____



3. _____

- 4. six and five tenths 6.5
- 5. twenty-two and nine tenths _____
- 6. thirty-six and fourteen hundredths _____
- 7. forty-seven hundredths _____
- 8. one hundred six and four tenths _____
- 9. seven and three hundredths _____
- 10. one tenth less than 0.6 _____
- 11. one hundredth less than 0.34 _____
- 12. one tenth more than 0.2 _____

READING DECIMALS

Just like there are place value names for numbers larger than 0, there are also names for place values after the decimal point.

thousands	hundreds	tens	ones	.	tenths	hundredths	thousandths
1	2	4	5	.	1	7	6

Decimal

Read As

Equivalent Fraction

0.7

seven tenths

$$\frac{7}{10}$$

0.23

twenty-three hundredths

$$\frac{23}{100}$$

0.045

forty-five thousandths

$$\frac{45}{1000}$$

15.01

fifteen and one hundredth

$$15\frac{1}{100}$$

Hint:
"and" separates
the whole number
from the fraction.

Fill in each blank with the correct equivalent.

	Decimal	Read As	Equivalent Fraction
A.	0.3	three-tenths	_____
B.	1.12	_____	_____
C.	_____	two hundred twenty-one thousandths	_____
D.	_____	_____	$\frac{53}{100}$
E.	0.871	_____	_____
F.	_____	_____	$\frac{5}{100}$
G.	0.783	_____	_____
H.	_____	two and six tenths	_____
I.	_____	_____	$\frac{115}{1000}$

Name _____

Date _____

Comparing Decimals

Put the correct sign (>, <, =) in each problem.

Comparing decimals is similar to comparing whole numbers.

1. Line up the numbers by place value.
2. Compare the digits left to right.

Example 1 0.08 ○ 0.8

1. Line up:
$$\begin{array}{r} 0.08 \\ 0.8 \end{array}$$
2. Compare.



After the decimal point, you have a 0 and an 8. 8 is bigger than 0, so 0.8 is bigger.

$$0.08 < 0.8$$

Example 2 11.13 ○ 11.03

$$\begin{array}{r} 11.13 \\ 11.03 \end{array}$$

The 11's before the decimal point are the same. After the decimal point, is 1 or 0 bigger? 1 is.

$$11.13 > 11.03$$

1. 0.007 ○ 0.07

2. 2.159 ○ 2.259

3. 10.05 ○ 10.005

4. 0.99 ○ .009

5. 30.249 ○ 30.429

6. 0.004 ○ 4.00

7. 6.041 ○ 6.401

8. 92.001 ○ 92.001

9. 263.08 ○ 263.81

10. 0.08 ○ 0.8

11. 101.05 ○ 101.005

12. 9.50 ○ 7.05

13. 214.01 ○ 214.001

14. 9.008 ○ 9.08

15. 614.05 ○ 614.05

16. 8.26 ○ 8.026

17. 43.014 ○ 43.104

18. 0.83 ○ 0.63



COMPARING AND ORDERING DECIMALS

Write the prices on the menu in order from least to greatest.

A. \$1.25 \$2.03 \$1.07 \$2.51 \$1.10 \$2.15 \$2.21 \$1.05

Item:	Price:
Soda	
Milk	
Fries	
Salad	
Cheese Sandwich	
Tuna Sandwich	
Hamburger	
Cheeseburger	

Circle the largest decimal in each row.

B. 4.05 4.50 4.005 4.15 4.55 4.5

C. 10.57 10.49 10.005 10.057 10.75 10.094

D. 2.5 2.15 2.52 2.005 2.095 2.51

E. 1.8 1.84 1.48 1.847 1.75 1.5

F. 89.90 88.19 8.90 89.09 89.5 89.01

Name _____

Adding and Subtracting Decimals

When adding or subtracting decimals, place the decimal points under each other. That way, you add tenths to tenths, for example, not tenths to hundredths. Add or subtract beginning on the right, as usual. Carry or borrow numbers in the same way. Adding 0 to the end of decimals does not change their value, but sometimes makes them easier to add and subtract.

Examples:

$\begin{array}{r} 39.43 \\ + 0.81 \\ \hline 40.24 \end{array}$	$\begin{array}{r} 0.084 \\ + 0.470 \\ \hline 0.554 \end{array}$	$\begin{array}{r} 3.58 \\ - 0.8 \\ \hline 2.78 \end{array}$	$\begin{array}{r} 6.83 \\ - 2.14 \\ \hline 4.69 \end{array}$
--	---	---	--

Directions: Solve the following problems.

1. Write each set of numbers in a column and add them.

a. $2.56 + 0.6 + 76 =$ _____

b. $93.5 + 23.06 + 1.45 =$ _____

c. $3.23 + 91.34 + 0.85 =$ _____

2. Write each pair of numbers in a column and subtract them.

A. $7.89 - 0.56 =$ _____ B. $34.56 - 6.04 =$ _____ C. $7.6 - 3.24 =$ _____

3. In a relay race, Alice ran her part in 23.6 seconds, Cindy did hers in 24.7 seconds, and Erin took 20.09 seconds. How many seconds did they take altogether? _____

4. Although Erin ran her part in 20.09 seconds today, yesterday it took her 21.55 seconds. How much faster was she today? _____

5. Add this grocery bill:

potatoes—\$3.49; milk—\$2.09; bread—\$0.99; apples—\$2.30 _____

6. A yellow coat cost \$47.59, and a blue coat cost \$36.79. How much more did the yellow coat cost? _____

7. A box of Oat Boats cereal has 14.6 ounces. A box of Sugar Circles has 17.85 ounces. How much more cereal is in the Sugar Circles box? _____

8. The Oat Boats cereal has 4.03 ounces of sugar in it. Sugar Circles cereal has only 3.76 ounces. How much more sugar is in a box of Oats Boats? _____



Name _____

Multiplying Decimals

Steps:

1. Ignore the decimal point, and multiply as with whole numbers.
2. Count the number of decimal places in both factors.
3. Place the decimal point that many places from the right in the product.

Example:

$$\begin{array}{r} 0.46 \longrightarrow 2 \text{ decimal places} \\ \times 0.9 \longrightarrow 1 \text{ decimal place} \\ \hline 0.414 \longrightarrow 3 \text{ decimal places} \end{array}$$



Directions: Multiply. Show your work in the space below.

1.2×0.4 _____ 0.5×0.1 _____ 1.1×0.73 _____

0.6×0.3 _____ 1.5×0.4 _____ 14.5×0.23 _____

2.4×1.8 _____ 0.82×0.2 _____ 0.09×0.4 _____

Name _____

What's the Sign?

Directions: Insert the correct signs (+, -, x, ÷) to make each problem correct.



$11 + 1 = 6 \times 2$

$10 \div 2 = 3 + 2$

$24 \quad 6 = 6 \quad 3$

$15 \quad 5 = 3 \quad 1$

$36 \quad 12 = 4 \quad 20$

$4 \quad 5 = 16 \quad 4$

$2 \quad 2 = 16 \quad 4$

$48 \quad 8 = 3 \quad 2$

$-5 \quad 5 = 4 \quad 4$

$64 \quad 8 = 32 \quad 4$

$1 \quad 7 = 56 \quad 7$

$5 \quad 5 = 0 \quad 4$

$8 \times 3 \quad 3 = 9 \quad 3$

$14 \quad 7 = 1 \quad 1$

$1 \quad 1 = 1 \quad 1$

Name _____

Dividing Decimals by Decimals

When a divisor has a decimal, eliminate it before dividing. If there is one digit right of the decimal in the divisor, multiply the divisor and dividend by 10. If there are two digits right of the decimal in the divisor, multiply the divisor and dividend by 100.

Multiply the divisor and dividend by the same number whether or not the dividend has a decimal. The goal is to have a divisor with no decimal.

Examples: $2.3 \overline{) 89} \times 10 = 23 \overline{) 890}$

$4.11 \overline{) 67.7} \times 100 = 411 \overline{) 6770}$

$4.9 \overline{) 35.67} \times 10 = 49 \overline{) 356.7}$

$0.34 \overline{) 789} \times 100 = 34 \overline{) 78,900}$

After removing the decimal from the divisor, work the problem in the usual way.

Directions: Solve the following problems.

1. $3.5 \overline{) 10.15}$

2. $6.7 \overline{) 415.4}$

3. $0.21 \overline{) 924}$

4. $73 \overline{) 50.37}$

5. The body can burn only 0.00015 of an ounce of alcohol an hour. If an average-sized person has 1 drink, his/her blood alcohol concentration (BAC) is 0.0003. How many hours will it take his/her body to remove that much alcohol from the blood?

6. If the same person has 2 drinks in 1 hour, his/her blood alcohol concentration increases to 0.0006. Burning 0.00015 ounce of alcohol an hour, how many hours will it take that person's body to burn off 2 drinks? _____

7. If someone has 3 drinks in 1 hour, the blood alcohol concentration rises to 0.0009. At 0.00015 an hour, how many hours will it take to burn off 3 drinks? _____



8. After a drunk driving conviction, the driver's car insurance can increase by as much as \$2,000. Still, this is only 0.57 of the total cost of the conviction. What is the total cost, in round numbers? _____

9. In Ohio in 1986, about 335 fatal car crashes were alcohol related. That was 0.47 of the total number of fatal car crashes. About how many crashes were there altogether, in round numbers? _____

EQUIVALENT DECIMALS AND FRACTIONS

Study how to rewrite decimals and fractions.

$$\frac{4}{10} = 0.4$$

$$5.78 = 5\frac{78}{100}$$

$$5\frac{874}{1000} = 5.874$$

$$1.521 = 1\frac{521}{1000}$$

Write each fraction or mixed number as a decimal.

A. $5\frac{78}{100} =$

$$\frac{23}{100} =$$

B. $1\frac{3}{100} =$

$$\frac{5}{10} =$$

C. $\frac{548}{1000} =$

$$2\frac{53}{100} =$$

D. $53\frac{17}{100} =$

$$16\frac{303}{1000} =$$

E. $\frac{91}{1000} =$

$$91\frac{3}{10} =$$

Write each decimal as a mixed number or fraction.

F. $2.87 =$

$$0.983 =$$

G. $14.5 =$

$$287.69 =$$

H. $1.752 =$

$$0.7 =$$

I. $0.06 =$

$$10.054 =$$

J. $81.2 =$

$$0.157 =$$

Name _____ Date _____

Exercise 2.13

Write the mathematical expression for each and solve.

1. Divide 13.364 by 0.26.
2. Find the quotient of 27.48 and 6.
3. How many equal groups of 0.45 are there in 3.87?
4. You have 45.44 grams and share it equally with 8 students. How much does each student have?
5. Divide $\frac{4}{5}$ by $\frac{2}{3}$.
6. What is the quotient of $\frac{7}{8}$ and $\frac{1}{3}$?
7. How many equal groups of $\frac{1}{3}$ are there in 20?

Name _____ Date _____

Exercise 2.6

Write the mathematical expression for each and solve.

1. What is the difference between $\frac{7}{12}$ and $\frac{5}{16}$?2. How much more is $\frac{5}{8}$ than $\frac{1}{4}$?3. How much less is $\frac{3}{4}$ than $\frac{11}{16}$?4. Subtract $\frac{2}{3}$ from $\frac{5}{6}$.5. How much more do you need to go from $\frac{1}{2}$ to $\frac{5}{8}$?6. What amount is needed to go from $\frac{5}{8}$ to $\frac{5}{6}$?

Name _____ Date _____

Exercise 2.9

The word OF in a mathematical expression usually indicates that we need to multiply. For example, taking $\frac{1}{2}$ of 30 means $\frac{1}{2} \times 30$, which is 15. Taking 40% of 20 means 0.40×20 , which is 8.

Remember: When you change a percentage to a decimal, you move the decimal point two places to the left. Also, you do NOT need a common denominator when multiplying fractions!

Write each phrase as a mathematical expression. Ask your teacher if you are to go ahead and solve the problem.

1. 35% of 80

2. 40% of 60

3. 28% of 50

4. 30% of 90

5. 54% of 160

6. 76% of 300

7. $\frac{1}{3}$ of 63

8. $\frac{1}{3}$ of 75

9. $\frac{2}{3}$ of 60

10. $\frac{2}{3}$ of 77

11. $\frac{5}{8}$ of 48

12. $\frac{1}{4}$ of 56

Name _____ Date _____

Exercise 4.7

Use estimation to decide if each situation is reasonable or not. Explain your answers.

Bowling Alley Prices

Games	\$1.75 each
Shoe rental	\$1.50
Drinks	sm. 50¢ lg. \$1.00
All snack items	75¢ each

1. Gabe has time to rent shoes and bowl only one game. Dad gives him a \$5 bill. The clerk gives him less than a dollar in change.

2. Clint, Devlin, and Ray each have \$10.00. Each plans to bowl three games, rent shoes, and have a large drink and two snacks.

3. Chelten rents shoes and bowls three games. She decides to treat Chelsi, Addie, and herself to small drinks. Chelten started out with \$10.00.

4. Lance and Uncle Chaddrick challenge Marli and Aunt Paige to bowl three games. All four need to rent shoes. The losing team will buy large drinks for everyone. Each team has \$20.00.

Ratios, Proportions, & Percents (cont.)

ACTIVITY 109 Percent Problems

Name: _____

Date: _____

Reminder: The word *of* in mathematics means to multiply.

For problems that ask what number is a certain percent of a given number, change the percent to a decimal and then multiply by the number.

Example: What is 45% of 80? $(0.45)(80) = ?$ 45% of 80 is 36.



Calculate these percentages.

1. What is 75% of 120? _____
2. What is 30% of 50? _____
3. What is 25% of 88? _____
4. What is 10% of 34? _____
5. What is 20% of 200? _____
6. What is 98% of 150? _____
7. What is 2% of 24? _____
8. What is 15% of 30? _____

ACTIVITY 110 Percent Problems

Name: _____

Date: _____

Reminder: The word *of* in mathematics means to multiply.

For problems that ask what percent of one number another number is, set up a proportion as in this example.

Example: 45 is what percent of 90? $\frac{45}{90} = \frac{p}{100}$

Cross multiply: Solve for $45 \cdot 100 = 90p$. Solve for $p \rightarrow p = \frac{4,500}{90} = 50$, so 45 is 50% of 90.

Solve.

1. 25 is what percent of 50? _____
2. 60 is what percent of 180? _____
3. 12 is what percent of 60? _____
4. 100 is what percent of 1,000? _____
5. 18 is what percent of 360? _____
6. 75 is what percent of 300? _____
7. 14 is what percent of 70? _____
8. 35 is what percent of 140? _____



Ratios, Proportions, & Percents (cont.)

ACTIVITY 111 Percent Problems

Name: _____

Date: _____

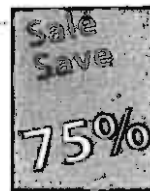
Reminder: The word *of* in mathematics means to multiply.

To solve a problem that asks a certain percent of what number is another number, set up a problem like the one in the example.

Example: 80% of what number is 52? First change the percent to a decimal ($80\% = 0.8$). Then call the unknown n and set up an equation: $(0.8)(n) = 52$. Solve the equation by dividing both sides by 0.8 $\rightarrow n = \frac{52}{0.8} = 65$, so 80% of 65 is 52.

Solve.

1. 75% of what number is 60? _____
2. 42% of what number is 63? _____
3. 20% of what number is 15? _____
4. 75% of what number is 48? _____
5. 60% of what number is 42? _____
6. 6% of what number is 12? _____
7. 9% of what number is 45? _____
8. 30% of what number is 15? _____



ACTIVITY 112 Word Problems With Percents

Name: _____

Date: _____

Solve.

1. Sam scored 85% on his test. There were 60 problems on the test. How many did he get right? _____
2. Lorisa is a waitress. Her customers' bills totaled \$300. She earned \$45 in tips. What percent did her customers tip her? _____
3. Bill has paid 60% of the cost of his stereo. He has paid \$180. How much did his stereo cost? _____
4. How much does a \$500 TV cost that is on sale for 25% off? _____



Ratios, Proportions, & Percents (cont.)

ACTIVITY 113 Percent of Change

Name: _____

Date: _____

Reminder: To find the percent of change, follow these steps:

- Subtract to find the amount of change.
- Divide the amount of change by the original amount.
- Change the decimal to a percent. Indicate if the change is positive or negative (going up or down).

Example: What is the percent of change from 100 pounds to 160 pounds?

$$160 - 100 = 60 \rightarrow \frac{60}{100} = 0.6 = 60\% \text{ increase}$$

Find the percent of change. Indicate if each is an increase or a decrease. Round answers to the nearest tenth.



- | | | | |
|--------------------|-------|-------------------|-------|
| 1. From 50 to 75 | _____ | 2. From 32 to 8 | _____ |
| 3. From 150 to 250 | _____ | 4. From 80 to 160 | _____ |
| 5. From 125 to 50 | _____ | 6. From 145 to 0 | _____ |
| 7. From 100 to 81 | _____ | 8. From 16 to 20 | _____ |

ACTIVITY 114 Review Percents/ Test Taking

Name: _____

Date: _____

Fill in the bubble next to the correct answer.

- | | | | |
|-------------------------------|--------------------|-------------------|---------------------|
| 1. Change 20% to a fraction. | (a) $\frac{1}{20}$ | (b) $\frac{1}{5}$ | (c) $\frac{1}{200}$ |
| 2. Change 7% to a decimal. | (a) 0.7 | (b) 7.1 | (c) 0.07 |
| 3. Change 3.5 to a percent. | (a) 35% | (b) 350% | (c) 3.5% |
| 4. What is 30% of 60? | (a) 18 | (b) 24 | (c) 30 |
| 5. 40 is what percent of 160? | (a) 25% | (b) 30% | (c) 20% |
| 6. 60% of what number is 90? | (a) 100 | (b) 120 | (c) 150 |

Handwritten notes: 60% PERCENTS, 32% PERCENTS, 125 DECIMALS, 85, FRACTIONS $\frac{1}{5}$

Ratios, Proportions, & Percents

ACTIVITY 99 Ratios

Name: _____

Date: _____

Write each ratio as a fraction in simplest form.

- | | | | |
|---------------------|-------|--------------|-------|
| 1. 24 to 6 | _____ | 2. 35:70 | _____ |
| 3. 9 out of 27 | _____ | 4. 25 to 100 | _____ |
| 5. 2 out of every 5 | _____ | 6. 15:33 | _____ |
| 7. 45:30 | _____ | 8. 4 to 18 | _____ |
| 9. 16 out of 26 | _____ | 10. 2 to 100 | _____ |





ACTIVITY 100 Rates

Name: _____

Date: _____

Express each ratio as a unit rate.

- | | | | |
|-----------------------------------|---|-----------------------------------|---|
| 1. \$20 for 5 tickets |  | 2. \$42 for 14 gallons of gas | _____ |
| 3. 3.6 inches of rain in 12 hours | _____ | 4. \$8.50 for 10 pounds of apples |  |
| 5. Driving 250 miles in 4 hours | _____ | 6. \$2.16 for 4 ounces of cereal | _____ |

Ratios, Proportions, & Percents (cont.)

ACTIVITY 101 Equivalent Ratios

Name: _____

Date: _____

Reminder: To find equivalent ratios, multiply the numerator and the denominator by the same number (except 0).

List two equivalent ratios for each ratio.

1. $\frac{3}{4}$ _____

2. $\frac{1}{6}$ _____

3. $\frac{10}{12}$ _____

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

5. $\frac{9}{10}$ _____

6. $\frac{2}{5}$ _____



ACTIVITY 102 Proportions

Name: _____

Date: _____

Reminder: A proportion is an equation that gives two equivalent ratios. The cross products of a proportion are always equal.

If $\frac{a}{b} = \frac{c}{d}$ then $a \cdot d = b \cdot c$.

$\frac{a}{b} = \frac{c}{d}$ then $a \cdot d = b \cdot c$

Write *Yes* or *No* to indicate if each of these is a proportion.

1. $\frac{1}{2} = \frac{4}{8}$ _____

2. $\frac{6}{18} = \frac{3}{9}$ _____

3. $\frac{4}{5} = \frac{8}{12}$ _____

Solve each proportion.

4. $\frac{n}{8} = \frac{6}{24}$ _____

5. $\frac{60}{15} = \frac{x}{3}$ _____

6. $\frac{10}{100} = \frac{3}{m}$ _____

7. $\frac{16}{5} = \frac{20}{t}$ _____

8. $\frac{7}{s} = \frac{4}{8}$ _____

9. $\frac{k}{9} = \frac{14}{3}$ _____