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The GED Mathematics Test

Decimals



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Video 30 Focus: knowing how to use decimals to show parts of numbers.

You Will Learn From Video 30:

- > Our number system uses only 10 numerals.
- > A numeral's position is what gives it meaning.
- > Our system of place value is the key to our number system.
- ➢ How to read and write decimals.
- > The rules for performing the four operations with decimals.



Words You Need to Know:

While viewing the video, fill in the blanks below using these words: **place value, decimal, rounding, value, operations** Answers are on page 14.

Our number system uses 10 numerals, and the ______ of each numeral gives it its meaning. Each place represents the ______ of the number to the left or the right of the ______ point. This point separates the whole numbers from the fractional parts. The four ______ of addition, subtraction, multiplication, and division have special rules for decimals. It is important to practice ______ of decimals because we are often asked to show the answer to a problem to a given number of places. For example, money always has two places to the right of the decimal point.



Points to Remember:

- Place value is the key to knowing how to use the numbers in our system.
- It is important to be able to read and write decimals correctly.
- A misplaced decimal point will completely change the value of an answer.
- Money is an everyday use of decimals.

Introduction to Decimals

StudentBounty.com Our system of numbers uses the 10 numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9 to write all numbers. The position of each numeral gives it meaning in our base ten number system. Each column represents a value that is a multiple or part of ten.



The numbers on the chart above are examples of how the place value makes each number what it is. Every whole number has an "understood" decimal on its right.

The number 7 has only ones since it is less than (<) 10.

The number 29 has two tens and nine ones -20 + 9.

The number 460 has four hundreds, six tens, and no ones. We use the place holder 0 when the place is empty -400 + 60 + 0.

The number 3, 731 has three thousands, seven hundreds, three tens, and two ones --3000 + 700 + 30 + 2.

As shown by the arrow, the places continue in this pattern forever -- to infinity (∞). Look at the pattern if we show the place names with numerals:

1	
10	
100	
1,000	



10

Each place adds a zero (multiply by 10 since it is a base 10 system). So the next two places would be:

10,000	ten thousands
100,000	hundred thousands

What is the number for the next place? _	
--	--

How many zeroes does it have?

What is the name of that place?

Practicing writing the numeral that represents the following values: Answers are on page 14.

three hundreds/five tens/six ones	
five tens/zero ones	
four ones	
five thousands/zero hundreds/one ten/two ones	



Now we will add the places to right of the decimal point which have values that are fractional parts of ten.

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	h	undreds	tens	ones	tenths	hundre	edths	\Rightarrow
⇐								
thousands					6			thousandths
				•	2	5		
					3	2	5	
				•	0	7	2	

These decimal fractions are six tenths (6/10), twenty-five hundredths (25/100), three hundred twenty-five thousandths (325/1000), and seventy-two thousandths (72/1000). The last digit to the right names the place. Each place adds a zero (divide by 10 since it is a base 10 system). So the next place would be: _________

Write it as a fraction: 1/_____

Practice writing the numerals that represent the following values. Don't forget to start with the decimal point.

Answers are on page 14.

five tenths	forty-two hundredths _	seven hundredths
one hundred thirty-six thousa	ndths	fifty-five thousandths
one tenth	one hundredth	four ten thousandths

Reading and Writing Decimals

StudentBounts.com Learning to read and write decimals correctly is fundamental to understanding our system of place value. Reading decimals is not hard if you practice a few simple rules:

- Numbers to the right of the decimal point or whole numbers are read from left to right, • "297 is read two hundred ninety-seven." You may hear some people use the word "and" when reading that number, but that is incorrect -- do not say two hundred *and* ninetyseven.
- The word "and" is used correctly when reading mixed decimals with numerals on both sides of the decimal point such as 45.26. You would read this number, "forty-five and twenty-six hundredths."
- If a number has digits only to the left of the decimal, you read the number and give it the name of the place on the far left. For example, .7 is read, "seven tenths;" .67 is read, "sixty-seven hundredths;" and .398 is read, "three hundred ninety-eight thousandths."
- You may hear someone say the word "point" when reading decimals. You could hear .67 read, "point six seven" instead of "sixty-seven hundredths." Using the word, "point," is an informal way to express a number and is not the correct way to read the decimal.

Practice reading the following numbers aloud. Then write exactly what you said on the line that follows.

Answers are on page 14.

Read	Write
56	
129	
.8	
.54	
.432	
1,387	
12.4	
3.765	
126.11	
\$39.99	
.777	
2.09	
.1	
.006	

About Math and Life

StudentBounty.com One of the ways that we most use decimals in our daily lives is when we are taking care of our transportation needs. If we have a car, we have to buy gasoline and pay for repairs. We calculate driving distances and figure out mileage. We may have to rent a parking place or use meters. We may save money by taking the bus or using other kinds of public transportation. Money and these purposes.

other decimal numbers are used for all of



Jose decided to keep records of how up the 12-gallon tank for \$23.52. How much was the gasoline per gallon?

His friend, Maria, drove a pizza delivery car and had to keep track of the miles she drove on each

shift. On Tuesday night she delivered four pizzas. She drove 7.6 miles, 9.1 miles, 3 miles, and 4.9 miles for the deliveries. How much mileage did she record for the evening.

Andreas took the bus to and from work. The fare was \$1.25 each way. After the first month (20 work days), he found out he could buy a monthly pass for \$45.00. How much did he save by buying a monthly pass?



Sylvia worked in the same job as Andreas but rode the bus four days each week. Should she buy a monthly pass? Explain why or why not.

Answers are on page 15.

Order of Operations - Review

Parentheses () **Exponents** - powers and roots Multiplication and division - in order from left to right Addition and subtraction - in order from left to right

Please excuse my dear Aunt Sally.

Complete the following problems while practicing the rules for Order of Operations. Answers are on page 15.

56 + 1 x 3 =	$5^2 + 2 \times 3 =$	$(2+3+4)^2 \times 2 =$	15/3 x 2 - 6 =
3 x 8 - 4 + 8 =	$4^2 + (4^2 x \ 2) =$	$(4^2 + 4^2) \ge 2 =$	2 x 6/2 + 10 =
6 + 7 x 8 =	$3^2 + 4 \ge 2 =$	$(16 \div 2)^2 \times 2 =$	19 - 10 + 3 - 12 =

Rounding Decimals

StudentBounts.com Rounding a decimal number means expressing it to the nearest tenth, hundredth, thousandth, and so on. If you are rounding a number to the nearest tenth, look at the number in the hundredths' place. If that number is five or more, round it up to the next highest tenth. For example, round .46 up to .5. If the number in the hundredths' place is four or less, leave the number in the tenths' place as it is. For example, round .42 to .4.

Here are more examples:

Original Decimal	Rounded to the Nearest Tenth	Rounded to the Nearest Hundredth
.56	.6	
.453	.5	.45
.92	.9	
.4262	.4	.43
.888	.9	.89

Round each of the following decimals to the nearest tenth.

.37	.34	.16	.87	.75	.91	.07
.123	.127	.125	.876	.067	.019	.199

Round each of the following decimals to the nearest hundredth:

.123	.456	.789	.064	.067	.008	.399
.1357	.2468	.0088	.0163	.0068	.13465	.97562

Answers are on page 15.

Measure Up

For each of the amounts below, estimate the amount that is closest to them. Answers are on page 15.



Write inch, foot, yard, or mile after each amount to show the closest measurement.

2 feet	2 yards		24 inches
4 inches	length of a paper clip		7 inches
20 yards	1,000 yards		1.5 miles
height of an adult male		length of a new	vborn puppy

Operations with Decimals

StudentBounts.com There are rules for adding, subtracting, multiplying, and dividing decimals. It is important to know these rules and follow them in order to come up with the correct answer. If the decimal point is not placed in its proper place, the answer will be incorrect. Read the summary of the rules for each operation below. Detailed examples with guided practice will follow.

Addition +	Subtraction -	Multiplication x	Division ÷
Line up the decimal	Line up the decimal	Multiply ignoring the	Clear the decimal
points and do the	points and do the	decimal(s).	from the divisor by
math.	math.	To place the decimal	moving it as many
		in the answer, count	places as needed.
Addition is easy!	Subtraction is easy!	the total places to the	Move the decimal the
		<i>right</i> of the decimal(s)	same number of
		in the factors, and	places in the dividend.
		place the decimal the	Bring the decimal
		same number of	straight up into the
		places to the left in	quotient.
		the product .	

Addition



Just make sure to keep the decimal points lined up. Then add just as you would add whole numbers. Try these examples: Answers are on page 15.

.45	\$35.33	29.7	15.777	\$1,148.90	.08
<u>+.79</u>	+ 46.89	+ 4.95	+1.22	+ 687.16	<u>.197</u>

If the numbers are not written vertically, it is best to copy them onto another piece of paper so that you can keep the decimals lined up when you do the addition. Try these examples:

.35 + 12.56 + .127 =	\$87.44 + .76	= .765 + .6 +.7	+ .32 + .231 =
.8 + .08 =	1.9 + .6745 =	\$1,969.00 + 329.54 =	.1 + .11 + 1.11 =

Hal worked as a waiter at The Blue Rose. He received \$26.50 in tips on Thursday, \$30.75 on Friday and twice as much as Friday on the busiest night, Saturday. How much money did Hal



Subtraction



StudentBounts.com Just make sure to keep the decimal points lined up. Then subtract just as you would subtract whole numbers. Try these problems.

\$782.45	4.92	9.6	.867	.99	.88
- 55.66	<u>88</u>	<u>- 4.3</u>	55	<u>764</u>	551

If there are empty places in the number on top of the subtraction problem (minuend), you should fill those places with zeroes to hold the place and keep the problem correctly lined up. In the problems above, the last two problems are examples:

.990	.880	More practice:	.98	.7	.36
764	551		<u>769</u>	<u>6872</u>	2

If the numbers are not written vertically, it is best to copy them onto another piece of paper so that you can keep the decimals lined up when you do the subtraction. Try these examples:

12.5 - .671 = .8 - .333 = .1789 - .04 = 231.5 - 13.66 =

Susy worked as a carhop at the Forever Frosty drive-in. On a summer weekend she earned \$36.00 less than Hal earned in

that weekend?



tips at The Blue Rose. How much did Susy earn

Answers are on page 15.

Addition and Subtraction Mixed Practice

Remember the rules for adding and subtracting decimals are the same -- line up the decimal points and do the math. Watch the signs.

78.9 + .68 + .06 =	\$14.98 - 13.99 =	\$139.05 + 23.97 + .99 =
45.16 - 1.89 + .592 =	45.16 + 1.89592 =	.16 + .45 + .07 + 1.39 =
134.899 =	\$100.00 - 29.99 =	.247 + .009 + 3 =

Answers are on page 15.

Multiplication

There are two rules to follow when multiplying decimals:

- 1. Multiply ignoring the decimal(s).
- StudentBounty.com 2. To place the decimal in the answer, count the total places to the *right* of the decimal(s) in the *factors*, and place the decimal the same number of places to the **left** in the **product**.

462.1	Count the places to the <i>right</i> of the decimals in the <i>factors</i> .
<u>x .32</u>	There are three.
9242	Place the decimal three places to the left in the product .
<u>13863</u>	
147872	147.872 is the correct answer.

The following problems are already multiplied correctly. Practice placing the decimal point in the answer.

.36 x 1.2 = 432	.67 x .4 = 268	23 x .006 = 138	1.9 x 1.8 = 342
25 x 4.1 = 1025	.7 x .8 = 56	21.8 x .08 = 1744	5.5 x 1.08 = 594

Now follow both rules to multiply these decimals.

3.6 x .09 =	32 x .5 =	*.08 x .04 =





.006	$2 \ge 6 = 12$
<u>x .2</u>	The decimal must be moved four places to the left.
12	Fill the other two places with zeroes as place holders.
	The answer is .0012

The Veg Out Nursery planted a square display garden to show off the new varieties of tomatoes. The gardener planted seven Best Boys, 12 Fourth of Julys, and 10 Better Bushes in the plot. The plot measured 3.4 meters on each side. What was the distance around the edge of the garden?

Better Bush

Veg Out sold the tomatoes in four inch plastic pots for \$2.45 each or six for \$12.00. How much did a customer save by buying six tomato plants?

Answers on pages 15 and 16.

Division

There are three rules to follow when dividing decimals:

- StudentBounty.com 1. Clear the decimal from the divisor by moving it as many places to the right as needed.
- 2. Move the decimal the same number of places in the dividend.
- 3. Bring the decimal straight up into the quotient.

.34) 2.04		34) 204.	Move the decimal two places
Move decimal two places to the right clear it from the divisor.	ght to	⇒	in the dividend as well. \downarrow
9	Pla	ace the	6.
•	deo ab	ove in the quotient.	34) 204.

Set up these problems and follow the rules for dividing decimals to find the correct answers.

 $.6 \div .2$ $.3 \div .06$ $.06 \div .3$ $12.5 \div 25$ $12.6 \div .56$ $30.4 \div .02$

Always remember that you may have to add zeroes to hold places when dividing. Look at this example:

5100. \Rightarrow 5) 25500. \Rightarrow .05) 255 5) 25500.

More practice:

945.6 ÷ 3 94.56 ÷ 3 125.5 ÷ .25 .06 ÷ .6 46.56 ÷ .2 844 ÷ .4

All of the cousins in the Bentley family shared a sum of money left by their grandparents. There were 12 cousins who shared \$6,600.72, which were the proceeds from the sale of savings bonds. How much did each cousin receive?

One of the cousins, Marilee, was married with children of her own. She decided to open a savings account for each of her two children after she treated herself to a \$100.00 shopping spree. How much money did she put into each savings account?

One of the children, Andreas, had been saving quarters. He had enough to add \$55.75 to his new savings account. How many quarters had he saved?



Answers are on page 16.

Out into Space



HOW MANY RECTANGLES?



Answer is on page 16.

Decimal Operations - Mixed Practice

-	-	*	•
2.4 + .89 + .986 =	45.88 ÷ .4 =	9.62 x 6 =	4,583.9 - 23.5 =
88.88/.22 =	3.65576 + 75 =	(2.5)(2.7) =	.5 + .6 + .7 + .88 =
100 - 6.852 =	3.4 + .34 + 34 =	7.03 + 1.68 =	4.4 x 44 x 0 =
171.6 ÷ 5.2	14.4/ 1.2 =	100 + 2.8 + 1.76 =	5 x .5 x .33 =

Answers are on page 16.

STRATEGY SESSION

Test authors often place numbers or written information that is not needed to find the correct answer to a problem. This information is placed there to distract the reader and to test whether or not the problem solver can understand the problem thoroughly and know which numbers and which information is important to the solution. As you practice solving problems, it is a good idea to identify the important information using key words and to identify which information is not needed. It is even a good idea to cross out the information that is extraneous (extra) so you won't end up using it to solve the problem. However, on the GED Math Test, you cannot write in the test booklet. So you will not be able to actually cross out information. You can make a note on your scratch paper. You should get into the habit of using your scratch paper to list key words, note the operation or operations needed, and to use other strategies you have learned to help you get to the correct answer as quickly as possible.

Take time to read the problem carefully and decide which information is needed to find the solution and which information is extraneous. Develop a plan to solve the problem and use your thinking skills, scratch paper, and calculator (if permitted) to decide which of the answer choices is correct. You may have to come up with the answer and bubble it into an alternate format grid.



STRATEGY SESSION

"succritBounty.com Watch for Extraneous Information Not Needed to Solve the Problem

Look at this problem from the decimal exercises:

The Veg Out Nursery planted a square display garden to show off the new varieties of tomatoes. The gardener planted seven Best Boys, 12 Fourth of Julys, and 10 Better Bushes in the plot. The side. What was the distance around the edge of the plot measured 3.4 meters on each garden?

ask yourself what question you have to answer. The Read the problem carefully and task is to find the distance around the square garden. If each side measures 3.4 meters, then the total of the four sides can be found by multiplying 4 x 3.4 meters. The names of the varieties and the numbers for each variety are extraneous information. Some students may get trapped into using the numbers 7, 12, and 10 when trying to solve the problem.

Read the following problems and cross out any extraneous information. Then write the method you would use to solve the problem. Answers are on page 16.

Veg Out sold the tomatoes in four inch plastic pots for \$2.45 each or six for \$12.00. How much did a customer save by buying six tomato plants?

Bill and Al are workout partners. They exercised 245 out of 365 days in 2002 and met their goal to increase their program by 50 days in 2003. Bill lifts eight-pound weights, and Al uses 12pound weights. Both men do three sets of 15 reps for each exercise. In 2004, they have a new goal to add 50 more days to their schedule. If they meet their goal, how many days will they exercise in 2004?

Suzette and Margot are workout partners at Silver's Gym. They use the treadmill for 20 minutes three days a week. After the treadmill they use Nautilus weight machines on two days and do a set of exercises for stretching and balance on the third day. This regimen includes a body bar that weighs 18 pounds and a large, pink resist-a-ball. If they do not miss any days, how many workouts will they do in a 12-week session?

Munch Munch Nuggets cereal boasts only 110 calories per serving with only 15 of those calories from fat. If Wanda eats a serving each day for a week, how many fat calories will she consume?

Watch for Extraneous Information Not Needed to Solve the Problem



GED Exercise

- Cindy and Megan are on the cross country team. They practiced running 6.8 miles on Monday. Then the coach said, "Double it girls!" They completed that practice on Tuesday. How far did the girls run for the two days?
 - 1) 13.6 miles
 2) 14.4 miles
 - 3) 20.4 miles
 - 4) 20.6 miles
 - 5) 25.1 miles
- 2. Andy learned about entrepreneurship in his econ class. Then he decided to start a small business. He named his business Andy in Action and cleaned offices after school and houses on the weekends. He did one job every day for two weeks. He earned \$20.00 for each office and \$45.00 for each house. How much did he make on the houses?
 - 1) \$100.00 2) \$180.00 3) \$200.00 4) \$290.00 5) \$380.00





How many rectangles?

- 1) three
- 2) four

3.

- 3) six
- 4) eight
- 5) nine

- Se 4. Valery and Lubov were excited when their father gave them a jar of nickels and dimes he had been saving. They ended up with \$19.80. Half of the money was dimes, and the other half was nickels. How many nickels did they have?
 - 1) 90 nickels
 - 2) 95 nickels
 - 3) 99 nickels
 - 4) 198 nickels
 - 5) 200 nickels
- 5. The children decided to spend the nickels on toys and candy. They turned the dimes into dollar bills and put them in a box for a future project. How many bills went into the box?
 - seven
 eight
 nine
 ten
 eleven



- 6. Felicia was making a large pot of stew for a family gathering. Her recipe called for 1.5 pounds of round steak. The meat cost \$2.69 per pound. She had to make a triple batch for the large crowd. How much did she pay for the meat?
 - 1) \$16.14 2) \$12.10 3) \$10.76 4) \$ 8.07 5) \$ 5.38



Answers and Explanations

StudentBounty.com

Words Y	ou Need	page 1				
place val value decimal operation rounding	lue ns g					
Fill in th	e Blanks	page 2				
1,000,00 six millions	0					
356 50 4 5,012						
Introduc	tion to D	ecimals	page 3			
ten thous 1/10,000	sandths					
.5 .136 .1	.42 ,01	.07 .055 .0004				
Reading	and Wri	ting Decimals	page 4			

Read	Write
56	fifty-six
129	one hundred twenty-nine
.8	eight tenths
.54	fifty-four hundredths
.432	four hundred thirty-two thousandths
1,387	one thousand, three hundred eighty-seven
12.4	twelve and four tenths
3.765	three and seven hundred sixty-five thousandths
126.11	one hundred twenty-six and eleven hundredths
\$39.99	thirty-nine dollars and ninety-nine cents
.777	seven hundred seventy-seven thousandths
2.09	two and nine hundredths
.1	one tenth
.006	six thousandths

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About Math and Life						page 5			BOL
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Order	r of Opera	ations I	Review	CK (10 W)	JIK Udys)	pages 5 and	6	monuny pass.	
59 28 62		31 48 17		162 64 128		4 16 0	-		
Rounding Decimals					page 6				
.4 .1	.3 .1	.2 .1	.9 .9	.8. .1	.9 .1	.1 .2			
.12 .14	.46 .25	.79 .01	.06 .02 .	.07 .01	.01 .14 .	.40 .98			
Measure Up					page 6				
yard inch yard yard		yard inch mile		yard foot mile foot					
Addit	tion					page 7			
1.24		\$82.2	2	34.65		16.997	\$1,836.06	.277	
13.03 .88	7	88.2 2.574	5	2.616 \$2,29	8.54	1.32			
\$118.	.75								
Subtraction						page 8			
\$726. .226 11.82	.79 29	4.04 .329 .467		5.3 .1389		.317 .211 217.84	.226 .0128	.329 .16	
\$82.7	'5								
Addit	tion and S	Subtractio	on Mixed	Practice		page 8			
79.64 43.86 133.8	52 31	\$.99 46.45 \$70.0	8	\$164. 2.07 3.256	01				

					TACINA
Multiplication			page 9		BOLL
.432 102.5	.268 .56	.138 1.744	3.42 5.94		12
Multiplication			page 9		
.324 13.244	16 .1221	.0032 .01			
13.6 meters \$2.70					
Division			page 10		
22.5	3	5	.2	.5	1,520
2.110	315.2	31.52	502	.1	232.8
\$550.06 \$225.03 223 quarters					
Out into Space			page 11		
nine rectangles					
Decimal Operati	ons Mixed Prac	tice	page 11		
4.276 404 93.148 33	114.7 77.895 37.74 12	57.72 6.75 8.71 104.56	4,560.4 2.68 0 .825		
Strategy Session			page 12		

SE

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Veg Out sold the tomatoes in four inch plastic pots for \$2.45 each or six for \$12.00. How much did a customer save by buying six tomato plants? $2.45 \times 6 = 14.70$ 14.70 - 12.00 = 2.70

Bill and Al are workout partners. They exercised 245 out of 365 days in 2002 and met their goal to increase their program by 50 days in 2003. Bill lifts eight-pound weights, and Al uses 12-pound weights. Both mendo three sets of 15 reps for each exercise. In 2004, they have a new goal to add 50 more days to their schedule. If they meet their goal, how many days will they exercise in 2004? 245 + 50 = 295 295 + 50 = 345 days in 2004

Suzette and Margot are workout partners at Silver's Gym. They use the treadmill for 20 minutes three days a week. After the treadmill they use Nautilus weight machines on two days and do a set of exercises for stretching and balance on the third day. This regimen includes a body bar that weighs 18 pounds and a large, pink resist a ball. If they do not miss any days, how many workouts will they do in a 12-week session?

3 days x 12 weeks = 36 workouts

Munch Munch Nuggets cereal boasts only 110 calories per serving with only 15 of those calories from fat. If Wanda eats a serving each day for a week, how many fat calories will she consume? 7 days x 15 fat calories = 105 fat calories



GED Exercise

page 13

- 1. 3) 2. 2)
- 3. 5) Squares are special kinds of rectangles with all four sides of equal length.
- 4. 4)
- 5. 3) 6. 2)