# The GED Mathematics Test 

## Decimals



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## GED

## Video Partner



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 $\qquad$
$\qquad$ of each numeral gives it its meaning. Each place
represents the $\qquad$ of the number to the left or the right
of the $\qquad$ point. This point separates the whole numbers from the fractional parts. The four $\qquad$ of addition, subtraction, multiplication, and division have special rules for decimals. It is important to practice $\qquad$ 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

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 ( $\infty$ ). Look at the pattern if we show the place names with numerals:

$$
\begin{array}{r}
1 \\
10 \\
100 \\
1,000
\end{array}
$$



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 $\qquad$


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


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: $\qquad$
Write it as a fraction: $1 /$ $\qquad$
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 $\qquad$ forty-two hundredths $\qquad$ seven hundredths $\qquad$ one hundred thirty-six thousandths $\qquad$ fifty-five thousandths $\qquad$ one tenth $\qquad$ one hundredth $\qquad$ four ten thousandths $\qquad$

## Reading and Writing Decimals

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 |  |
| :---: | :--- |
| 56 |  |
| 129 |  |
| .8 |  |
| .54 |  |
| .432 |  |
| 1,387 |  |
| 12.4 |  |
| 3.765 |  |
| 126.11 |  |
| $\$ 39.99$ |  |
| .777 |  |
| 2.09 |  |
| .1 |  |
| .006 |  |

## About Math and Life

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 other decimal numbers are used for all of
 these purposes.

Jose decided to keep records of how
much his new car was costing. He filled up the 12 -gallon tank for $\$ 23.52$. How much was the gasoline per gallon? $\qquad$
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. $\qquad$
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? $\qquad$


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. $\qquad$

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.

| $56+1 \times 3=$ | $5^{2}+2 \times 3=$ | $(2+3+4)^{2} \times 2=$ | $15 / 3 \times 2-6=$ |
| :--- | :--- | :--- | :--- |
| $3 \times 8-4+8=$ | $4^{2}+\left(4^{2} \times 2\right)=$ | $\left(4^{2}+4^{2}\right) \times 2=$ | $2 \times 6 / 2+10=$ |
| $6+7 \times 8=$ | $3^{2}+4 \times 2=$ | $(16 \div 2)^{2} \times 2=$ | $19-10+3-12=$ |

## Rounding Decimals

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 | .43 |
| .4262 | .4 | .89 |
| .888 | .9 |  |

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 $\qquad$ 2 yards $\qquad$
length of a paper clip $\qquad$ 7 inches $\qquad$
1,000 yards $\qquad$ 1.5 miles $\qquad$
height of an adult male $\qquad$ length of a newborn puppy $\qquad$

## Operations with Decimals

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 $\mathbf{x}$ | Division $\div$ |
| :---: | :---: | :---: | :---: |
| Line up the decimal points and do the math. <br> Addition is easy! | Line up the decimal points and do the math. <br> Subtraction is easy! | Multiply ignoring the decimal(s). <br> 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. | Clear the decimal from the divisor by moving it as many places as needed. Move the decimal the same number of places in the dividend. Bring the decimal straight up into the quotient. |

## 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 |
| ---: | ---: | ---: | :--- | :--- | :--- |
| +.79 | +46.89 | $\underline{+4.95}$ | $\underline{+1.22}$ | $\underline{+687.16}$ | $\underline{.197}$ |

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:

$$
\begin{array}{lll}
.35+12.56+.127= & \$ 87.44+.76= & .765+.6+.7+.32+.231= \\
.8+.08= & 1.9+.6745= & \$ 1,969.00+329.54=
\end{array} .1+.11+1.11=
$$

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
 earn in tips?

## Subtraction



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 |
| :--- | ---: | ---: | ---: | :---: | :---: |
| $-\quad 55.66$ | -.88 | -4.3 | -.55 | -.764 | -.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 |  | -.769 | -.6872 | -.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 1, tips at The Blue Rose. How much did Susy earn that weekend?


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.

| $78.9+.68+.06=$ | $\$ 14.98-13.99=$ | $\$ 139.05+23.97+.99=$ |
| :--- | :--- | :--- |
| $45.16-1.89+.592=$ | $45.16+1.89-.592=$ | $.16+.45+.07+1.39=$ |
| $134.8-.99=$ | $\$ 100.00-29.99=$ | $.247+.009+3=$ |

Answers are on page 15.

## Multiplication

There are two rules to follow when multiplying decimals:

1. Multiply ignoring the decimal(s).
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 right of the decimals in the factors. |
| :--- | :--- |
| $\frac{\mathrm{x} .32}{9242}$ | There are three. |
| $\frac{13863}{147872}$ | Place the decimal three places to the left in the product. |
|  |  |

The following problems are already multiplied correctly. Practice placing the decimal point in the answer.
$.36 \times 1.2=432$
$.67 \times .4=268$
$23 \times .006=138$
$1.9 \times 1.8=342$
$25 \times 4.1=1025$
$.7 \times .8=56$
$21.8 \times .08=1744$
$5.5 \times 1.08=594$

Now follow both rules to multiply these decimals.
$3.6 \times .09=$
$32 \times .5=$
*. $08 \times .04=$

$17.2 \times .77=.11 \times 1.11=\quad * .005 \times 2=$
*Remember that you may have to fill some places with zeroes if you need to move the decimal point more places than the answer fills up. For example, look at this problem:
.006
x .2 12
$2 \times 6=12$
The decimal must be moved four places to the left.
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 garden? side. What was the distance around the edge of the


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? $\qquad$

Answers on pages 15 and 16.

## Division

There are three rules to follow when dividing decimals:

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 to $\quad \Rightarrow$ clear it from the divisor.


Place the
decimal directly
above in the quotient.
in the dividend as well.
$\Downarrow$
6.
34) 204.

Set up these problems and follow the rules for dividing decimals to find the correct answers.
$12.6 \div .56 \quad .6 \div .2$
$.3 \div .06$
$.06 \div .3$
$12.5 \div 25$
$30.4 \div .02$

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

$$
. 0 5 \longdiv { 2 5 5 } \quad \Rightarrow \quad 5 \longdiv { 2 5 5 0 0 . } \quad \Rightarrow \quad 5 \longdiv { 2 5 5 0 0 . }
$$

More practice:
$844 \div .4 \quad 945.6 \div 3 \quad 94.56 \div 3 \quad 125.5 \div .25 \quad .06 \div .6 \quad 46.56 \div .2$
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? $\qquad$
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? $\qquad$
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? $\qquad$


## Out into Space



HOW MANY RECTANGLES?


Answer is on page 16.

## Decimal Operations - Mixed Practice



| $2.4+.89+.986=$ | $45.88 \div .4=$ | $9.62 \times 6=$ | $4,583.9-23.5=$ |
| :--- | :--- | :--- | :--- |
| $88.88 / .22=$ | $3.655-.76+75=$ | $(2.5)(2.7)=$ | $.5+.6+.7+.88=$ |
| $100-6.852=$ | $3.4+.34+34=$ | $7.03+1.68=$ | $4.4 \times 44 \times 0=$ |
| $171.6 \div 5.2$ | $14.4 / 1.2=$ | $100+2.8+1.76=$ | $5 \times .5 \times .33=$ |

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

## 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 plot measured 3.4 meters on each $\operatorname{lif}^{6}$ side. What was the distance around the edge of the garden?

Read the problem carefully and

ask yourself what question you have to answer. The 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 $4 \times 3.4$ 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? $\qquad$
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

1. 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) $\$ 380.00$


Andy in Action
3.


How many rectangles?

1) three
2) four
3) six
4) eight
5) nine
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?
1) seven
2) eight
3) nine
4) ten
5) 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) $\$ 5.38$


Words You Need to Know
place value
value
decimal
operations
rounding
Fill in the Blanks
1,000,000
six
millions

356
50
4
5,012
Introduction to Decimals
ten thousandths
$1 / 10,000$

| .5 | .42 | .07 |
| :--- | :--- | :--- |
| .136 |  | .055 |
| .1 | , 01 | .0004 |

Reading and Writing Decimals
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| Read |  |
| :---: | :--- |
| 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 |



Multiplication

| .432 | .268 | .138 |
| :--- | :--- | :--- |
| 102.5 | .56 | 1.744 |
|  |  |  |
| Multiplication |  |  |
|  |  |  |
| .324 | 16 | .0032 |
| 13.244 | .1221 | .01 |

page 9
3.42
5.94
page 9
page 10

| .2 | .5 | 1,520 |
| :--- | :--- | :--- |
| 502 | .1 | 232.8 |

\$550.06
\$225.03
223 quarters
Out into Space
page 11
nine rectangles
Decimal Operations -- Mixed Practice

| 4.276 | 114.7 | 57.72 | $4,560.4$ |
| :--- | :--- | :--- | :--- |
| 404 | 77.895 | 6.75 | 2.68 |
| 93.148 | 37.74 | 8.71 | 0 |
| 33 | 12 | 104.56 | .825 |

Strategy Session
page 12

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? $\$ 2.45 \times 6=\$ 14.70 \quad \$ 14.70-12.00=\$ 2.70$

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? $245+50=295 \quad 295+50$ $=345$ 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 alarge, 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 $\times 15$ fat calories $=105$ fat calories

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