

GCSE MATHS

DECIMAL NUMBERS

What are Decimals  
Place Value  
Ordering Decimals  
Addition  
Subtraction  
Multiplication  
Division  
Fractions, Decimals and Percentages  
Recurring Decimal to Fractions  
Word Problems

Decimals are the numbers that are a part of wholes.

Fractions and Percentages can be written as decimals

467.321

Integer Part

Decimal Part

DECIMAL POINT

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## PLACE VALUE

It is the value of a digit in a number

467.321

3.50

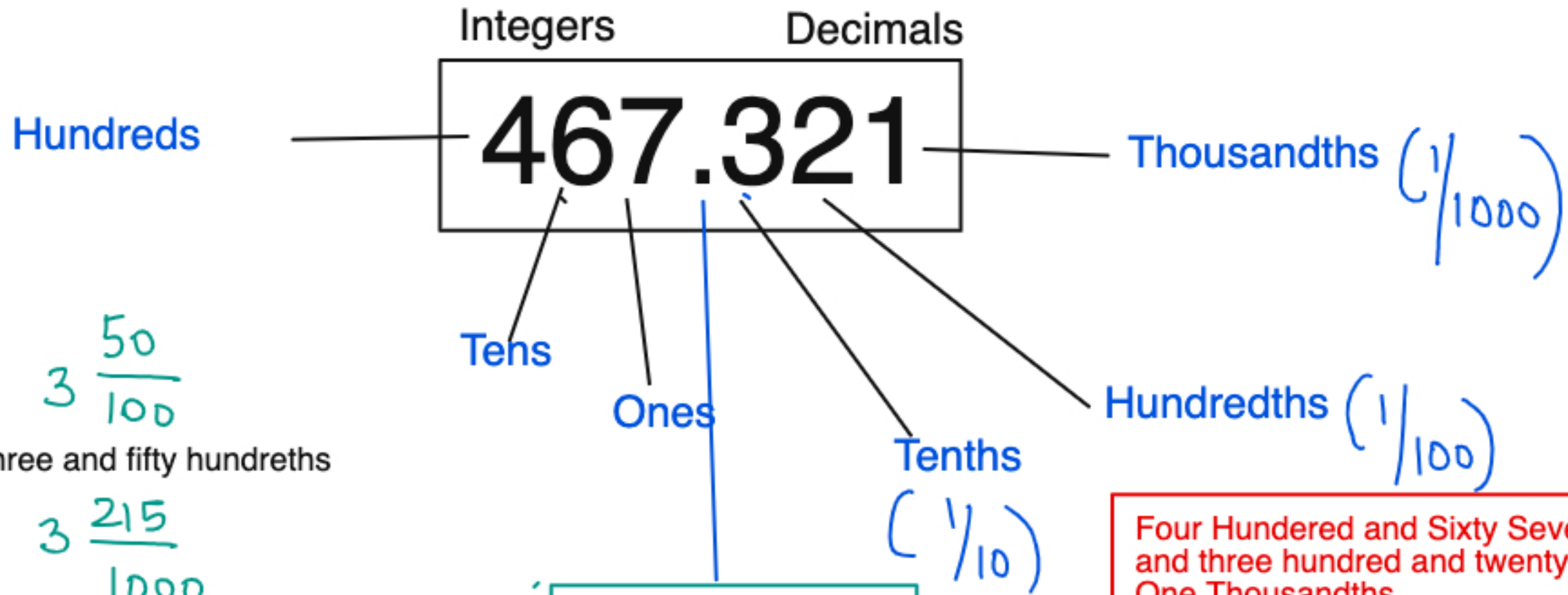
3.215

3.7

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**PLACE VALUE**

It is the value of a digit in a number



Four Hundred and Sixty Seven  
and three hundred and twenty  
One Thousandths

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$$3.50 = 3 \frac{50}{100}$$

Three and fifty hundredths

$$3.215 = 3 \frac{215}{1000}$$

Three and two hundred and fifteen thousandths

$$3.7 = 3 \frac{7}{10}$$

Three and seven tenths



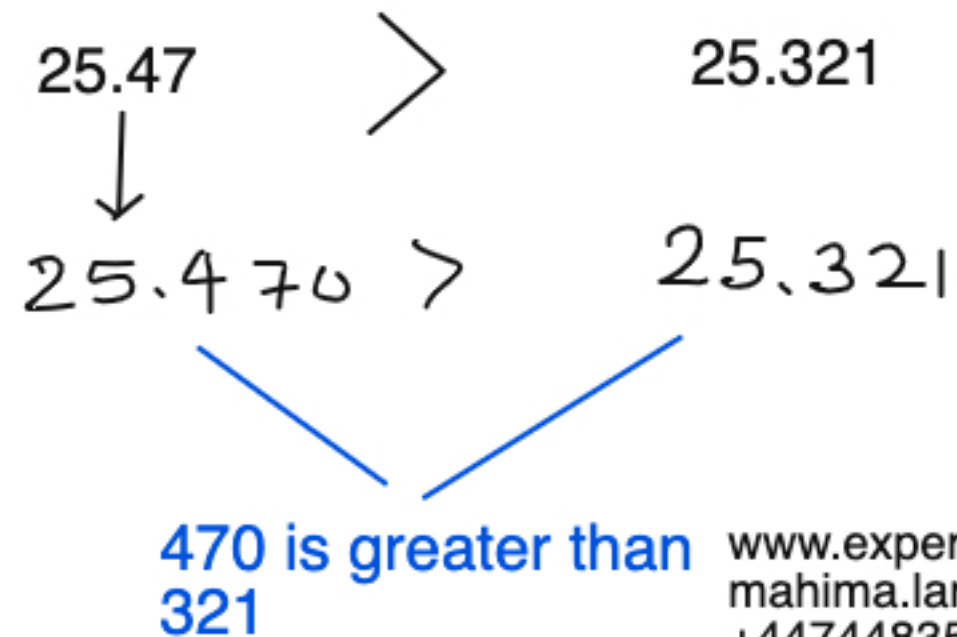
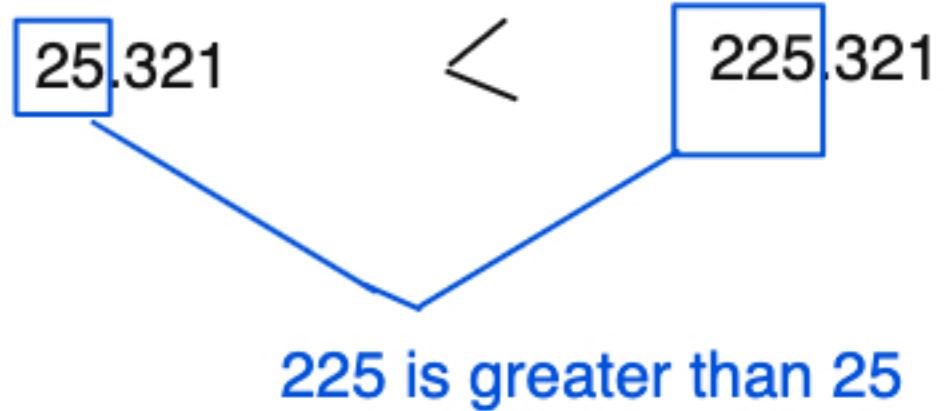
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Write the the digits underneath each other in their respective place value columns

Start Comparing the numbers from the left  
Compare the integers first and decimals next

To compare the decimals make sure that the decimal numbers have same number of decimals places

## ORDERING DECIMALS



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Compare the Following

- |           |        |
|-----------|--------|
| a) 3.12   | 4.65   |
| b) 23.321 | 23.221 |
| c) 25.347 | 25.44  |
| d) 625.25 | 625.5  |

## ORDERING DECIMALS

Write them in the order starting from smallest to largest

- |    |       |        |       |       |       |
|----|-------|--------|-------|-------|-------|
| a) | 4.231 | 4.121  | 6.6   | 6.121 | 2.21  |
| b) | 25.21 | 31.250 | 27.21 | 25.4  | 31.49 |

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## ORDERING DECIMALS

Compare the Following

$$\text{a) } 3.12 < 4.65$$

$$\text{b) } 23.321 > 23.221$$

$$\text{c) } 25.347 < 25.44$$

$$\text{d) } 625.25 < 625.5$$

Write them in the order starting from smallest to largest

$$\text{a) } 4.231 \quad 4.121 \quad 6.6 \quad 6.121 \quad 2.21$$

$$2.21 < 4.121 < 4.231 < 6.121 < 6.6$$

$$\text{b) } 25.21 \quad 31.250 \quad 27.21 \quad 25.4 \quad 31.49$$

$$25.21 < 25.4 < 27.21 < 31.250 < 31.49$$

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## ADDITION OF DECIMALS NUMBERS

Line up the decimal point

Write the number underneath each other in their respective Place values

Make the decimal places the same by putting Zero

Add the numbers by column addition

$$\begin{array}{r} 45.10 \\ + 04.34 \\ \hline 49.44 \end{array}$$

Q1 Add the following

- a) 22.5 and 6.2
- b) 2.124 + 4.2
- c) 28.321 + 0.99

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Line up the decimal point

Write the number underneath each other in their respective Place values

Make the decimal places the same by putting Zero

Add the numbers by column addition

$$\begin{array}{r}
 45.10 \\
 + 04.34 \\
 \hline
 49.44
 \end{array}$$

Q1 Add the following

a) 22.5 and 6.2

b) 2.124 + 4.2

c) 28.321 + 0.99

$$\begin{array}{r}
 2.124 \\
 4.2 \\
 \hline
 6.324
 \end{array}$$

$$\begin{array}{r}
 28.321 \\
 0.990 \\
 \hline
 29.311
 \end{array}$$

$$\begin{array}{r}
 22.5 \\
 + 6.2 \\
 \hline
 28.7
 \end{array}$$

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## SUBTRACTION OF DECIMAL NUMBERS

Line up the decimal point

Write the numbers underneath each in respective place values

Fill up the missing numbers by zeros

Do column subtraction

Subtract the following

a)  $47.231 - 25.1$

b)  $289.221 - 0.909$

c)  $2 - 1.25$

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## SUBTRACTION OF DECIMAL NUMBERS

Line up the decimal point

Write the numbers underneath each in respective place values

Fill up the missing numbers by zeros

Do column subtraction

Subtract the following

a)  $47.231 - 25.1$

$$\begin{array}{r} 47.231 \\ - 25.100 \\ \hline 22.131 \end{array}$$

b)  $289.221 - 0.909$

$$\begin{array}{r} 289.221 \\ - 0.909 \\ \hline 288.312 \end{array}$$

c)  $2 - 1.25$

$$\begin{array}{r} 2.00 \\ - 1.25 \\ \hline 0.75 \end{array}$$


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## MULTIPLICATION OF DECIMAL NUMBERS

Multiply the numbers as whole numbers with the column number

Count the total number of places in the both the numbers

Put the decimal points after the same number of places in the product.

Multiply the following

a)  $4.325 \times 6$

b)  $25.32 \times 4.6$

c)  $2.46 \times 0.25$

$$\begin{array}{r} 4.25 \\ \times 3.1 \\ \hline \end{array}$$

$$\begin{array}{r} 4.25 \rightarrow (2dp) \\ \times 3.1 \rightarrow (1dp) \\ \hline 425 \\ 1275 \\ \hline 13.175 \quad (3dp) \end{array}$$

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MULTIPLICATION OF DECIMAL NUMBERS

Multiply the numbers as whole numbers with the column number

Count the total number of places in the both the numbers

Put the decimal points after the same number of places in the product.

$$\begin{array}{r} 4.325 \\ \times 6 \\ \hline 25.950 \end{array}$$

$$\begin{array}{r} 25.32 \\ \times 4.6 \\ \hline 15192 \\ 10128 \times \\ \hline 116.472 \end{array}$$

Multiply the following

a)  $4.325 \times 6$   
 $25.95$

b)  $25.32 \times 4.6$   
 $116.472$

c)  $2.46 \times 0.25$   
 $0.6150$

$$\begin{array}{r} 2.46 \\ \times 0.25 \\ \hline 1230 \\ 492 \times \\ \hline 0.6150 \\ 4.25 \times 3.1 \end{array}$$

$4.25 \rightarrow (2dp)$   
 $\times 3.1 \rightarrow (1dp)$

---


$$\begin{array}{r} 425 \\ 1275 \times \\ \hline 13175 \end{array}$$

(3dp)

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a) Convert the divisor to whole number by multiplying the numerator or denominator by 10, 100 or 1000 depending on after how many places there is a decimal point

b) Divide by the bus stop method

c) Make sure the decimal point is in line.

$$a) 5.255 \div 5$$

$$\begin{array}{r}
 1.051 \\
 5 \overline{) 5.255} \\
 \underline{-5} \phantom{0} \phantom{0} \phantom{0} \\
 \phantom{0} 2 \phantom{0} \phantom{0} \\
 \phantom{0} \underline{-2} \phantom{0} \phantom{0} \\
 \phantom{0} \phantom{0} 5 \phantom{0} \\
 \phantom{0} \phantom{0} \underline{-5} \phantom{0} \\
 \phantom{0} \phantom{0} \phantom{0} 0
 \end{array}$$

$$b) 62.5 \div 0.25 = 250$$

$$\frac{62.5 \times 100}{0.25 \times 100} = \frac{6250}{25}$$

$$\begin{array}{r}
 250 \\
 25 \overline{) 6250} \\
 \underline{-50} \phantom{0} \phantom{0} \\
 \phantom{0} 12 \phantom{0} \phantom{0} \\
 \phantom{0} \underline{-12} \phantom{0} \phantom{0} \\
 \phantom{0} \phantom{0} 0 \phantom{0} \\
 \phantom{0} \phantom{0} \phantom{0} 0
 \end{array}$$

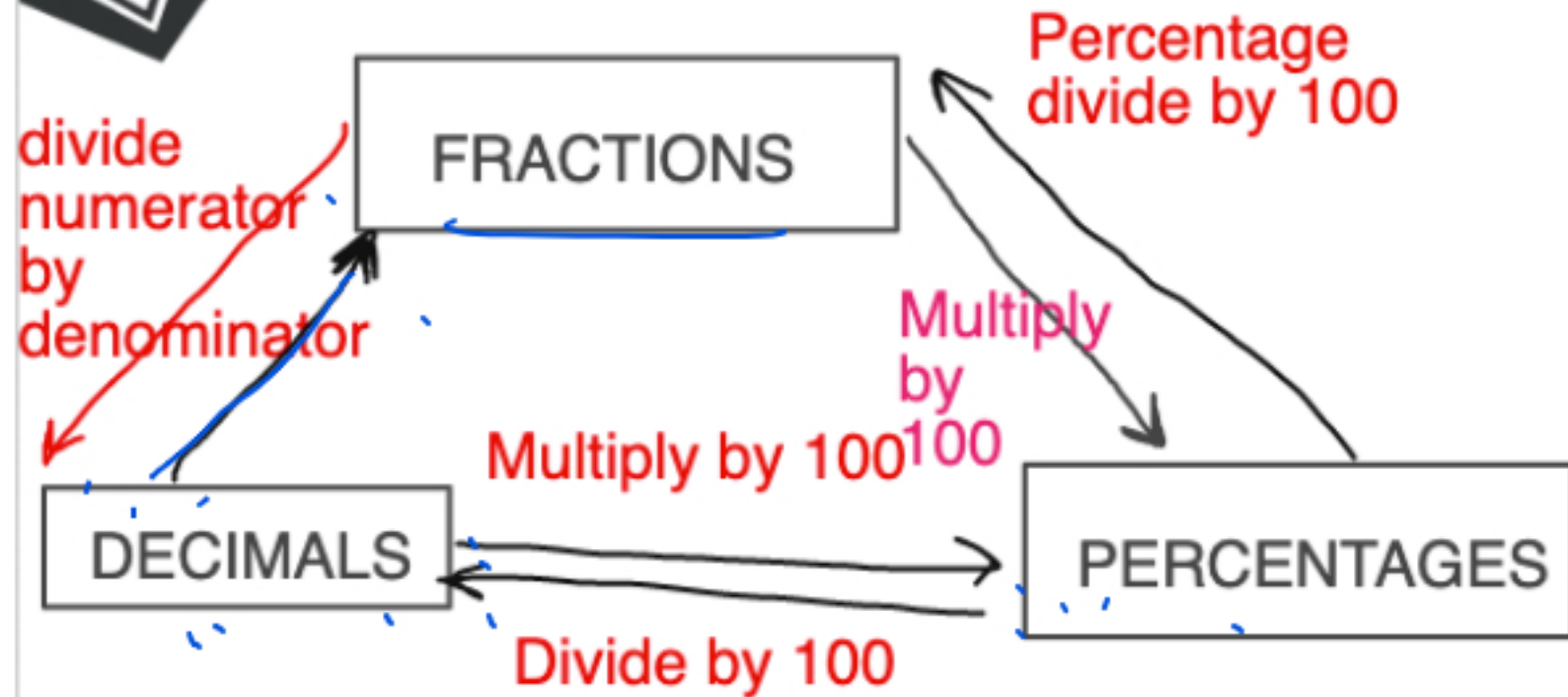
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# EXPERT GUIDANCE

## FRACTIONS, DECIMALS AND PERCENTAGES



Convert these fractions to decimals

a)  $\frac{3}{4}$

b)  $\frac{25}{100}$

Convert these decimals to percentages

a) 0.5

b) 0.84

Convert these percentages to fractions.

a) 15%

b) 25%

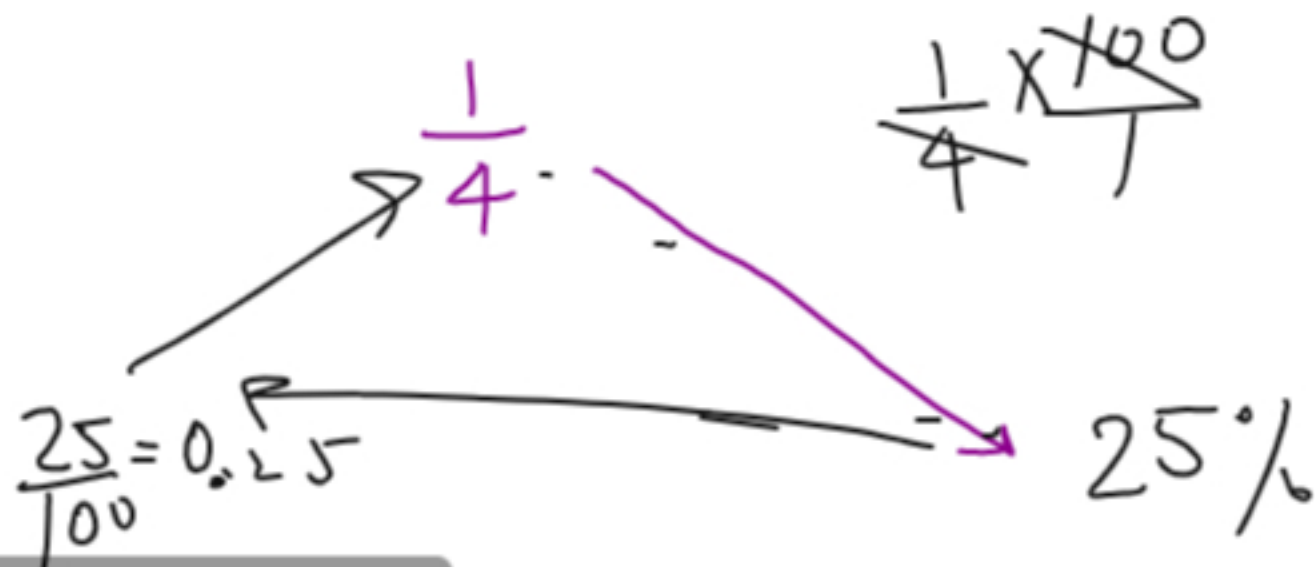
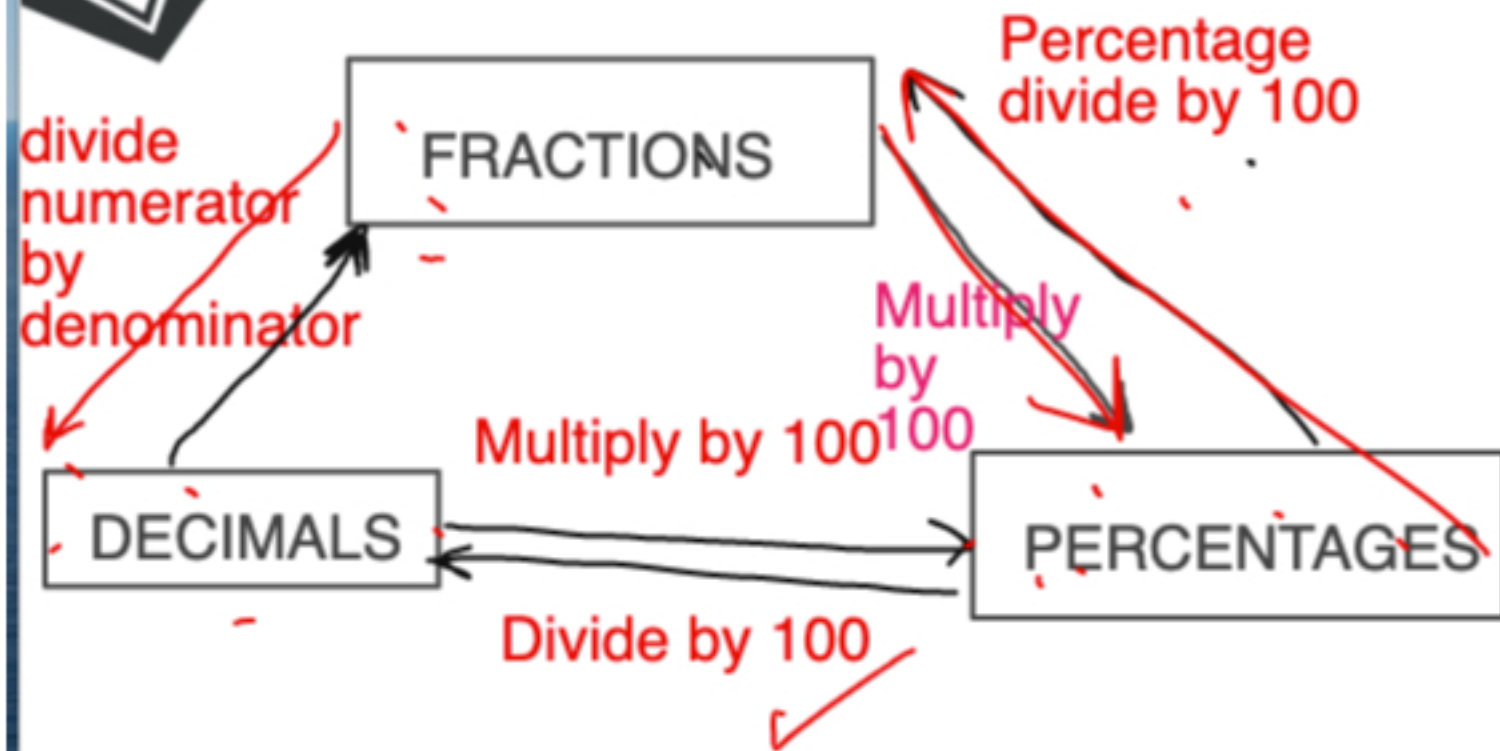


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# FRACTIONS, DECIMALS AND PERCENTAGES



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Convert these fractions to decimals

a)  $\frac{3}{4} = 0.75$       b)  $\frac{25}{100} = 0.25$

Convert these decimals to percentages

a)  $0.5 \times 100 = 50\%$       b)  $0.84 \times 100 = 84\%$

Convert these percentages to fractions.

a)  $15\% = \frac{15}{100} = \frac{3}{20}$       b)  $25\% = \frac{25}{100} = \frac{1}{4}$

$4 \overline{) 30.0} = 7.5$

Archive Utility

**RECURRING DECIMALS TO FRACTIONS**

- a) Make the recurring decimal = x (eqn1)  
 b) Multiply the x with 10, 100 or 1000 depending on how many digits are recurring (eqn2)  
 c) Subtract Eqn 2 and eqn 1  
 d) Solve to get a fractions .

a)  $0.\dot{7}$

$$x = 0.7777 \dots \text{--- (1)}$$

$$10x = 7.7777 \dots \text{--- (2)}$$

$$9x = 7$$

$$x = \frac{7}{9}$$

$$\text{(3)} - \text{(2)} = 1000x - 10x = 1359.59 - 13.59$$

$$990x = 1346$$

$$x = \frac{1346}{990}$$

b)  $1.3\dot{5}\dot{9}$

$$x = 1.35959 \dots \text{--- (1)}$$

$$\times 10 \rightarrow 10x = 13.5959 \dots \text{--- (2)}$$

$$\times 100 \rightarrow 1000x = 1359.5959 \dots \text{--- (3)}$$

If recurring is after a non-recurring number then multiply to get only recurring after the decimal point and then multiply with number of recurring points



## DECIMALS WORD PROBLEMS

Rate List

Tea = \$2.25

Coffee = \$3.50

Bread = \$5.25

Sandwich = \$8.35

John purchase one Tea, Two Coffee, three bread and 1 Sandwichh.

a) Find total bill of John

b) If John Gave \$100 how much change he will get

c) I have \$50 and I have to purchase a bread. How many bread I can purchase?



**DECIMALS WORD PROBLEMS**

Rate List

Tea = \$2.25
Coffee = \$3.50
Bread = \$5.25
Sandwich = \$8.35

John purchase one Tea, Two Coffee, three bread and 1 Sandwich.

a) Find total bill of John

One Tea = \$2.25 = \$2.25  
 Two Coffee = \$3.50\*2 = \$7.00  
 Three Bread = \$5.25\*3 = \$15.75  
 Sandwich = \$8.35 = \$8.35

$$\begin{array}{r}
 2.25 \\
 7.00 \\
 15.75 \\
 8.35 \\
 \hline
 \$33.35
 \end{array}$$

b) If John Gave \$100 how much change he will get

$$\begin{array}{r}
 100.00 \\
 - 33.35 \\
 \hline
 66.65
 \end{array}$$

c) I have \$50 and I have to purchase a bread. How many bread I can purchase?

9 Breads

$$50 \div 5.25 = \frac{50 \times 100}{5.25 \times 100} = \frac{5000}{525}$$

$$\begin{array}{r}
 525 \overline{) 5000.0} \\
 \underline{4725} \phantom{0} \\
 2750 \\
 \underline{2625} \\
 125
 \end{array}$$





NEXT STEP

★ CHECK SPECIFICATION

★ EXAM QUESTIONS ON THE TOPIC



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