

# MATHEMATICS GRADE 8



DATE: .....  
**TOPIC: DECIMAL FRACTIONS**

**CONCEPTS & SKILLS TO BE ACHIEVED:**

**By the end of these lessons, learners should know and be able to:**

- Write equivalent forms of common fractions and percentages as decimal fractions.
- Ordering and comparing decimal fractions to at least three decimal places.
- Rounding off decimal fractions to at least 2 decimal places.
- Addition, subtraction and multiplication of decimal fractions to at least 3 decimal places.
- Division of decimal fractions by whole numbers.
- Extend multiplication to multiplication by decimal fractions – not limited to one decimal place.
- Extend division to division of decimal fractions by decimal fractions.
- Calculate the squares, cubes and square roots and cube roots of decimal fractions.
- Use your knowledge of place value to estimate the number of decimal places in the result before performing calculations.
- Solving problems in context involving decimal fractions.

<b>RESOURCES:</b>	DBE Workbook, Sasol-Inzalo book, Textbooks,
<b>ONLINE RESOURCES</b>	<a href="https://www.visnos.com">https://www.visnos.com</a> <a href="http://www.virtualnerd.com">http://www.virtualnerd.com</a>

## DAY 1:

**INTRODUCTION: READ THE FOLLOWING TO FAMILIARISE YOURSELF WITH WHAT THIS TOPIC IS ABOUT:**

It is important to always keep in mind that the common fraction notation, the decimal notation and the percentage notation are just different ways to represent the same numbers/values.

- **Decimals** are used to describe a limited range of fractional units, namely tenths, hundredths, thousandths, etc. When we work with decimal fractions, we can do calculations the same way we do for whole numbers.



- A decimal has a power of ten in the denominator and you write it as a number with a decimal comma. The position of the digit after the decimal comma indicates the value of the decimal digits.
  - $\frac{2}{10} = 0,2$  ← one decimal place indicates tenths.
  - $\frac{26}{100} = 0,26$  ← two decimal places indicate hundredths.
  - $\frac{368}{1\ 000} = 0,368$  ← three decimal places indicate thousandths.

It will be useful to remember these two “rules” to assist you to determine if your answer is possibly correct or not:

1. If you **multiply** a number by a number **less than 1**, the answer will be **less/smaller** than the original number, e.g.  $2 \times 0,75 = 1,5$ .
2. When you **divide** a number by a number **between 0 and 1** ( $0 < n < 1$ ), the answer is **more/higher** than the original number, e.g.  $4 \div 0,5 = 8$ .

## LESSON DEVELOPMENT:

### EQUIVALENT FORMS:

It is important to remember that decimal fractions and common fractions are simply different ways of expressing the same number. We call them different notations.

To write a common fraction as a decimal fraction, we must first understand how to express the common fraction with a power of ten (10, 100, 1 000, etc.) as the denominator.

### EXAMPLE:

Let's look at the common fraction of  $\frac{3}{25}$ . The first step is to determine what must be done with the denominator to “change” it into a power of ten and still have the same value.

The **denominator is 25** and needs to be **multiplied by 4** to change to a **power of ten (100)**. It is vitally important to remember to **multiply both the numerator and denominator** by this value to keep the value of the fraction the same (equivalent fractions)

$$\frac{3}{25} = \frac{3}{25} \times \frac{4}{4} = \frac{12}{100}$$

From the fractions above we can see that the fractions are still equivalent fractions and it is just written where the denominator is now in a power of ten. This will enable us to easily write the common fraction as a decimal fraction.

If we follow the examples seen previously, we can easily write the fraction of  $\frac{12}{100}$  into a decimal fraction. We know that it will have two decimal places due to it being a fraction over a hundred.

$$\frac{12}{100} = 0,12$$

The 12 is from the numerator

The two decimal places are because it is a fraction of a hundredth

We can also work with decimal fractions that contain a whole number as well as a fractional part.

**EXAMPLE:**

We can write  $2\frac{3}{5}$  as a decimal fraction by first changing the fractional part to a fraction where the denominator is to a power of ten as we did in a previous example.

$$2\frac{3}{5} = 2 + \left(\frac{3}{5} \times \frac{2}{2}\right)$$
$$= 2 + \left(\frac{6}{10}\right)$$
$$= 2 + 0,6$$
$$= 2,6$$

$\frac{3}{5} = \frac{6}{10}$

**WRITING PERCENTAGES AS A DECIMAL FRACTION:**

It is difficult to compare fractions with different denominators. Fractions with the same denominators are easier to compare. For this and other reasons, fractions are often expressed as hundredths. Fractions that are expressed in hundredths can also be called percentages (a value out of a hundred).

Instead of saying 12 hundredths we can say 12 percent (12%),  $\frac{12}{100}$  or 0,12. These are all different ways to express the same number.

We can use the same principles that we used to write a common fraction as a decimal when we need to write a percentage as a decimal fraction.

**EXAMPLE:**

Write the following as a percentage, a common fraction and as a decimal fraction:

- 35 hundredths

Percentage	Common fraction	Decimal fraction
35 percent = 35%	$\frac{35}{100}$ $= \frac{7}{20}$	0,35



## CLASSWORK:

Work through the following exercises and write the answers in your classwork book. The answers can be found at the end of the day's lesson:



### ACTIVITY 1:

Write the following fractions as decimal fractions:

a)  $\frac{1}{2}$

b)  $\frac{7}{2}$

c)  $\frac{4}{5}$

d)  $\frac{32}{100}$



### ACTIVITY 2:

Write the fractions as decimal fractions.

a)  $\frac{23}{100} = 0,...$

b)  $\frac{13}{5} = 2,...$

c)  $\frac{54}{100} = 0,...$

d)  $\frac{125}{1\ 000} = 0,...$

e)  $\frac{13}{1\ 000} = 0,...$

f)  $\frac{26}{25} = 1,...$

### ACTIVITY 3:

Write the following as decimal fractions:

a)  $2 \times 10 + 1 \times 1 + \frac{3}{10}$

b)  $3 \times 1 + 6 \times \frac{1}{100}$

## IT IS IMPORTANT TO REMEMBER:

It is important to always keep in mind that the common fraction notation, the decimal notation and the percentage notation are just different ways to represent the same numbers/values.



A decimal has a power of ten in the denominator and you write it as a number with a decimal comma. The position of the digit after the decimal comma indicates the value of the decimal digits.



- $\frac{2}{10} = 0,2$  ← one decimal place indicates tenths.
- $\frac{26}{100} = 0,26$  ← two decimal places indicate hundredths.
- $\frac{368}{1\ 000} = 0,368$  ← three decimal places indicate thousandths.



## HOMEWORK:

Do the following exercises, applying what you have learnt today. **FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM BELOW TODAY'S LESSON**



### QUESTION 1:

Write the following fractions as decimal fractions:

a)  $\frac{1}{4}$   
c)  $\frac{3}{5}$

b)  $\frac{9}{5}$   
d)  $\frac{48}{100}$

### QUESTION 2:

Write the fractions as decimal fractions.

a)  $\frac{78}{100} = 0,...$

b)  $\frac{13}{4} = 3,...$

c)  $\frac{58}{100} = 0,...$

d)  $\frac{364}{1\ 000} = 0,...$

e)  $\frac{86}{1\ 000} = 0,...$

f)  $\frac{36}{25} = 1,...$

### QUESTION 3:

Write the following as decimal fractions:

a)  $4 \times 3 + 1 \times 2 + \frac{8}{10}$

b)  $2 \times 2 + 3 \times \frac{64}{100}$

## DAY 2:

### LESSON DEVELOPMENT:

#### ORDERING AND COMPARING DECIMAL FRACTIONS:

Decimal fractions are compared by looking at their number of tenths first, then at their hundredths, then at their thousandths, etc.

The numbers  $\frac{1}{10}$ ,  $\frac{10}{100}$  and  $\frac{100}{1\ 000}$  are all equivalent fractions. If we write this in decimal form notation as 0,1, 0,10 and 0,100, they are all also equivalent decimal fractions.

It is **IMPORTANT** to remember that the zeros at the end do not add any value to the number. We will use this fact to assist us when we must order and compare decimal fractions that have different decimal places.

**EXAMPLE:**

Determine which of the following decimal fractions is the biggest.

- 3,5
- 3,05

These fractions appear to be very similar; we must understand that because they have different decimal places, we first need to get them to the same number of decimal places before we can compare and determine which one is the biggest.

In order to increase the decimal places but keep the value of the number the same we can add a zero to the end of the decimal fraction as mentioned earlier.

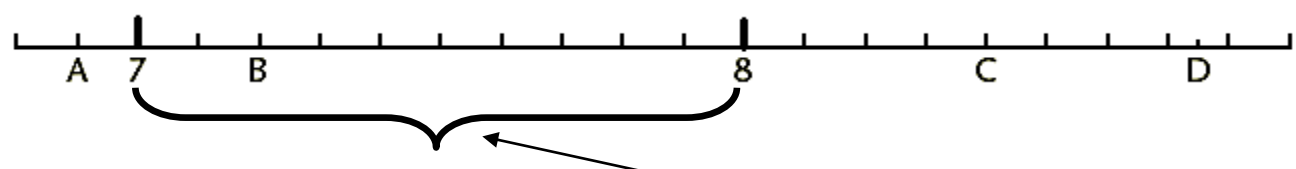
**e.g. 3,5 = 3,50 (added a zero to the end of 3,5)**

Now that we have them both we can compare them.

Because both have the same value as a whole number, we can just compare the decimal places.

From this we can see that 50 is bigger than 05 so therefor **3,5 > 3,05**

We can also use a number line to order and compare the decimal fractions.



We have 10 places for decimals so we can safely say that it will go 7,0; 7,1; 7,2 ... 7,8; 7,9; 8,0

We can see that there is 10 lines between the numbers 7 and 8, that means that each smaller line represents  $\frac{1}{10}$ th which means that the decimal fractions will have one decimal place.

From this we can easily determine what the values are of A - D

- A = 6,9**
- B = 7,2**
- C = 8,4**
- D = 8,75** (we can see that this one is a smaller line between 8,7 and 8,8,)

On a number line it is easy to determine the order of the values as they have already been ordered.

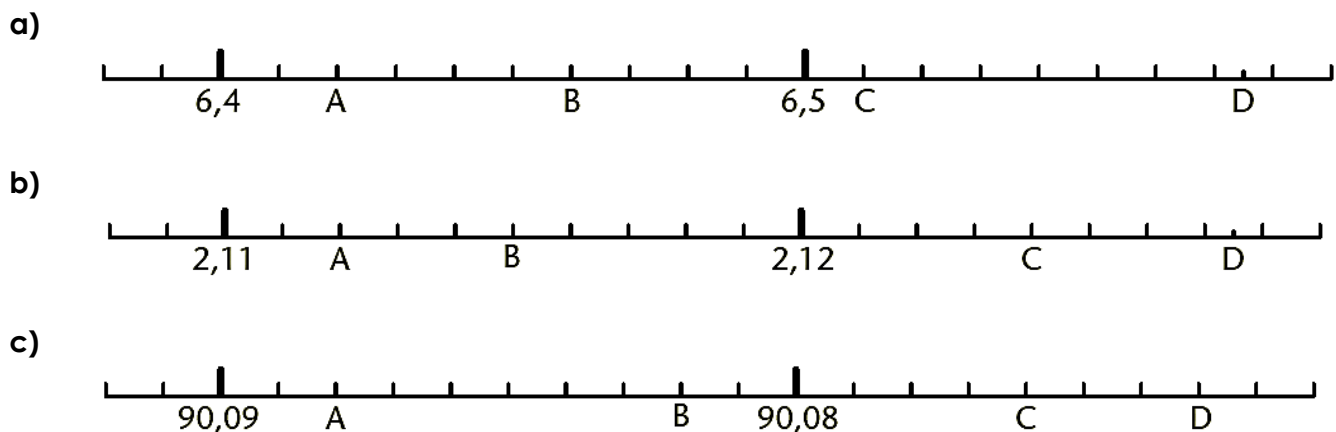


## CLASSWORK:

Work through the following exercises and write the answers in your classwork book. The answers can be found at the end of the day's lesson:

### ACTIVITY 1:

Write the values of the marked points (A – D) in as accurately as possible in decimal notation.



### ACTIVITY 2:

Order the following numbers from biggest to smallest. Explain your method.

0,8	0,465	0,901
0,025	0,36	0,79
0,9	0,05	0,009

### ACTIVITY 3:

The following table gives information about two-time world-champion heavyweight boxers. If they fight against one another, who would you expect to have the advantage, and why?

	Wladimir Klitschko	Alexander Povetkin
Height (m)	1,98	1,88
Weight (kg)	112	103,3
Reach (m)	2,03	1,91

### ACTIVITY 4:

Copy and fill in  $<$ ,  $>$  or  $=$ .

- |                   |                      |
|-------------------|----------------------|
| a) 3,08 ___ 3,8   | b) 4,876 ___ 4,099   |
| c) 2,75 ___ 2,689 | d) 123,321 ___ 123,3 |



### IT IS IMPORTANT TO REMEMBER:

Decimal fractions are compared by looking at their number of tenths first, then at their hundredths, then at their thousandths, etc.



The numbers  $\frac{1}{10}$ ,  $\frac{10}{100}$  and  $\frac{100}{1000}$  are all equivalent fractions. If we write this in decimal form notation as 0,1, 0,10 and 0,100, they are all also equivalent decimal fractions.



It is **IMPORTANT** to remember that the zeros at the end do not add any value to the number. We will use this fact to assist us when we must order and compare decimal fractions that have different decimal places.

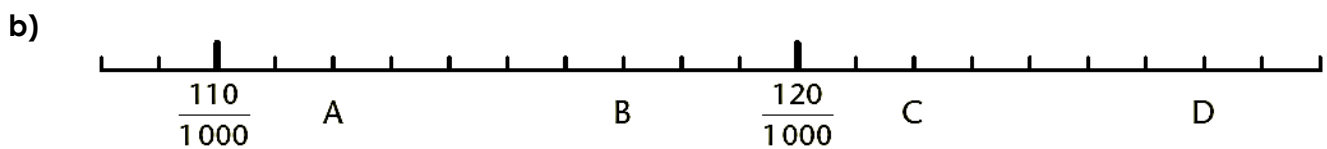
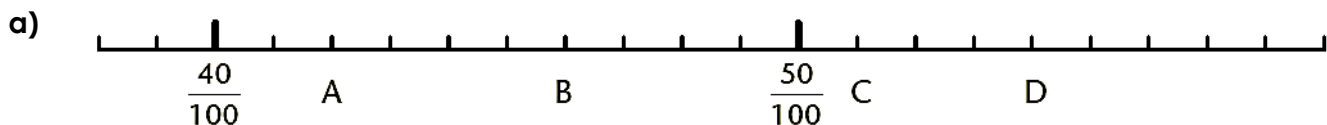
### HOMEWORK:

Do the following exercises, applying what you have learnt today. **FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM BELOW TODAY'S LESSON**



#### QUESTION 1:

Write the values of the marked points (A – D) in as accurately as possible in decimal notation.



#### QUESTION 2:

Order the following numbers from biggest to smallest. Explain your method.

- |       |       |       |
|-------|-------|-------|
| 0,925 | 0,012 | 0,125 |
| 0,87  | 0,637 | 0,01  |
| 0,62  | 0,9   | 0,871 |

#### QUESTION 3:

Copy and fill in <, > or =.

- |                   |                     |
|-------------------|---------------------|
| a) 0,45 ___ 0,451 | b) -0,561 ___ -0,56 |
| c) 0,23 ___ 0,231 | d) 1,211 ___ 1,21   |





## DAY 3:

### LESSON DEVELOPMENT:

#### ROUNDING OFF DECIMAL FRACTIONS:

Decimal fractions can also be rounded in the same way as whole numbers. They can be rounded to the nearest whole number or to one, two, three etc. figures after the comma. A very basic principle is followed when we round off.

You always look at the position after the point where you must round off, e.g. if you must round off to the second decimal, you look at the third decimal.

Below is a summary of where to round off to:

**Rounding to the nearest whole number:** If the tenths digit is:

- 5 or more – round up to the next whole number.
- Less than 5, round down to the current whole number.
- **Examples:** 5,7 becomes 6 and 5,3 becomes 5.

**Rounding to one decimal place:** If the hundredths digit is:

- 5 or more – round up to the next tenth.
- Less than 5, round down to the current tenth.
- **Examples:** 5,78 becomes 5,8 and 5,43 becomes 5,4.

**Rounding to two decimal places:** If the thousandths digit is:

- 5 or more – round up to the next hundredth.
- Less than 5, round down to the current hundredth.
- **Examples:** 5,699 becomes 5,70 and 4,453 becomes 4,45.

#### EXAMPLE:

Round each of the following off to the decimal place indicated:

- a) 29,452 to the nearest whole number
- b) 5,555 to one decimal place
- c) 81,899 to two decimal places.

#### ANSWERS:

- a) 29 (the first decimal is less than 5 so the whole number remains)
- b) 5,6 (the second decimal is 5 or more so the tenth is increased to the next tenth number)
- c) 8,90 (the third decimal is 5 or more so the hundredth is increased to the next hundredth)

### CLASSWORK:

Work through the following exercises and write the answers in your classwork book. The answers can be found at the end of the day's lesson:

#### ACTIVITY 1:

Round each of the following to the nearest whole number.

- |          |           |
|----------|-----------|
| a) 29,34 | b) 14,452 |
| c) 39,8  | d) 1,09   |



#### ACTIVITY 2:

Round each of the following numbers off to one decimal place.

- |          |           |
|----------|-----------|
| a) 18,59 | b) 5,496  |
| c) 6,089 | d) 421,34 |

#### ACTIVITY 3:

Round each of the following numbers off to two decimal places:

- |           |           |
|-----------|-----------|
| a) 8,345  | b) 5,595  |
| c) 21,879 | d) 67,692 |

### IT IS IMPORTANT TO REMEMBER:

You always look at the position after the point where you must round off, e.g. if you must round off to the second decimal, you look at the third decimal and then apply the following:

- When the decimal is less than five – the decimal place you round off to remains the same.
- When the decimal is 5 or more- the decimal place you round off to becomes one more.



### HOMEWORK:

Do the following exercises, applying what you have learnt today. **FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM BELOW TODAY'S LESSON**



#### QUESTION 1:

Round each of the following to the nearest whole number.



a) 15,59

b) 19,9

c) 40,63

d) 10,29

### QUESTION 2:

Round each of the following numbers off to one decimal place.

a) 5,982

b) 7,394

c) 7,349

d) 1 000,329

### QUESTION 3:

Round each of the following numbers off to two decimal places:

a) 5,3726

b) 9,439

c) 28,125

d) 14,033

## DAY 4:

### LESSON DEVELOPMENT:

#### CALCULATIONS WITH DECIMAL FRACTIONS:

##### ADDITION AND SUBTRACTION:

In previous grades you learnt that decimals use the same rules for addition and subtraction as integers.

When we add or subtract numbers, it is easier if the digits with the same place value are written underneath each other.

To add or subtract decimal fractions we must remember the following:

- **Tenths may be added/subtracted to tenths.**
- **Hundredths may be added/subtracted to hundredths.**

## Adding Decimals

*Example:*

$$0.32 + 12.965 + 1.1$$

Line up  
the  
decimal  
points

$$\begin{array}{r} 0.320 \\ 12.965 \\ + 1.100 \\ \hline 14.385 \end{array}$$

'Pad'  
with  
zeros

*Example:*

$$51 + 14.02 + 2.1$$

$$\begin{array}{r} 51.00 \\ 14.02 \\ + 2.10 \\ \hline 67.12 \end{array}$$

Change  
whole  
number to  
decimal

## Subtracting Decimals

*Example:*

$$13.8 - 1.27$$

Line up  
the  
decimal  
points

$$\begin{array}{r} 13.80 \\ - 1.27 \\ \hline 12.53 \end{array}$$

'Pad' with  
zeros and  
subtract

**EXAMPLES:**

Calculate each of the following:

a)  $16,52 + 2,35$

b)  $0,042 + 0,10$

c)  $45,67 - 23,2$

d)  $187,6 - 98,45$



## ANSWERS:

$$\begin{array}{r} \text{a)} \quad 16,52 \\ + 02,35 \\ \hline = \mathbf{18,87} \end{array}$$

$$\begin{array}{r} \text{b)} \quad 0,042 \\ + 0,100 \\ \hline = \mathbf{0,142} \end{array}$$

$$\begin{array}{r} \text{c)} \quad 45,67 \\ - 23,20 \\ \hline = \mathbf{22,47} \end{array}$$

$$\begin{array}{r} \text{d)} \quad 187,60 \\ - 098,45 \\ \hline = \mathbf{89,15} \end{array}$$

## MULTIPLICATION:

To multiply fractions written as decimals, convert the fractions to whole numbers by multiplying each decimal fraction by a power of ten (10). You then multiply the whole numbers and then convert back to decimals by dividing by the power of tens that you multiplied with.

### EXAMPLE:

$$13,1 \times 1,01$$

### STEPS:

- To change 13,1 to a whole number we must multiply 13,1 by 10 to eliminate the decimals.  
 $13,1 \times 10 = 131$
- To change 1,01 to a whole number we must multiply by 100 to eliminate the decimals.  
 $1,01 \times 100 = 101$
- Now that we have them as whole numbers, we can multiply them and divide the answer by the power of tens that we multiplied with earlier.  
 $131 \times 101 = 13\,231$   
 $\therefore 13\,231 \div 10 \div 100$       ( $\div 10$  is from step 1 and  $\div 100$  is from step 2)  
 $13\,231 \div 1\,000$   
 $= 13,231$

## DIVISION:

When we divide decimal fractions with each other we must determine which decimal fraction has the most decimal places. We must then multiply both sides by that power of ten to eliminate the decimal places and change them to whole numbers.

Once we have whole numbers, we can divide normally.

### EXAMPLE:

$$21,7 \div 0,07$$

The 21,7 has one decimal place but the 0,07 has two decimal places. That means that we must multiply both sides by the power of ten two times (100). This will change both decimal fractions into whole numbers but will remain equivalent forms.

$$\begin{aligned} &= (21,7 \times 100) \div (0,07 \times 100) \\ &= 2\,170 \div 7 \end{aligned}$$

$= 310$  (we can get to this answer by using mental calculations or by using the "long" division method)



### CLASSWORK:

Work through the following exercises and write the answers in your classwork book. The answers can be found at the end of the day's lesson:



#### ACTIVITY 1:

Calculate each of the following:



a)  $16,52 + 9,38$

b)  $16,52 + 9,78$

c)  $30,08 + 2,9$

d)  $9,99 + 0,99$



#### ACTIVITY 2:

Calculate each of the following:

a)  $45,67 - 23,80$

b)  $1,009 - 0,998$

c)  $0,9 - 0,045$

d)  $65,7 - 37,6$

#### ACTIVITY 3:

Calculate each of the following:

a)  $0,12 \times 0,3$

b)  $350 \times 0,043$

c)  $1,2 \times 0,3$

d)  $0,13 \times 1,6$

#### ACTIVITY 4:

Calculate each of the following:

a)  $62,5 \div 2,5$

b)  $6,25 \div 2,5$

c)  $6,25 \div 0,25$

d)  $0,625 \div 2,5$

### IT IS IMPORTANT TO REMEMBER:

When we add or subtract numbers, it is easier if the digits with the same place value are written underneath each other.



To add or subtract decimal fractions we must remember the following:



- **Tenths may be added/subtracted to tenths.**
- **Hundredths may be added/subtracted to hundredths**



To multiply fractions written as decimals, convert the fractions to whole numbers by multiplying each decimal fraction by a power of ten (10). You then multiply the whole numbers and then convert back to decimals by dividing by the power of tens that you multiplied with.

When we divide decimal fractions with each other we must determine which decimal fraction has the most decimal places. We must then multiply both sides by that power of ten to eliminate the decimal places and change them to whole numbers.

Once we have whole numbers, we can divide normally.



## HOMEWORK:

Do the following exercises, applying what you have learnt today. **FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM BELOW TODAY'S LESSON**



### QUESTION 1:

Calculate each of the following:

a)  $12,67 + 4,76$

b)  $157,9 + 2,48$

c)  $13,49 + 0,976$

d)  $10,01 + 2,538$

### QUESTION 2:

Calculate each of the following:

a)  $18,08 - 3,87$

b)  $18,98 - 8,96$

c)  $32,65 - 7,342$

d)  $8,965 - 4,236$

### QUESTION 3:

Calculate each of the following:

a)  $1,2 \times 0,35$

b)  $5,9 \times 0,42$

c)  $3,25 \times 0,75$

d)  $0,15 \times 6,5$

### QUESTION 4:

Calculate each of the following:

a)  $6,3 \div 0,21$

b)  $3,75 \div 0,5$

c)  $5,5 \div 0,25$

d)  $36 \div 0,2$

## DAY 5:

### LESSON DEVELOPMENT:

#### SQUARES AND CUBES OF DECIMALS:

Squaring and cubing a decimal is the same as multiplying decimals.

We can "drop" the decimal place and multiply the number by itself. When we have done that, we can add up the decimal places and put it back into the answer.

#### EXAMPLE:

$$0,12^2 = 0,12 \times 0,12$$



If we follow the multiplication steps, we will multiply both with a power of ten until we have eliminated the decimal.

$$0,12 \times 100 = 12$$

$$\begin{aligned} \square 12 \times 12 &= 144 \\ \square 144 \div 100 \div 100 &= 0,0144 \end{aligned}$$

Remember we are busy with squaring so that means we have two 100's that we have to bring back to create the decimal places.

$$0,1^3 = 0,1 \times 0,1 \times 0,1$$

$$0,1 \times 10 = 1$$

$$\begin{aligned} \square 1 \times 1 \times 1 &= 1 \\ \square 1 \div 10 \div 10 \div 10 &= 0,001 \end{aligned}$$

Remember we are busy with cubing so that means we have three 10's that we have to bring back to create the decimal places.

As we can see the squaring and cubing of decimal fractions is the same as the multiplying of decimal fractions. All that is different is that we are multiplying with the same numbers the whole time.

### SQUARE ROOTS AND CUBE ROOTS OF DECIMAL FRACTIONS:

We will only be working with perfect squares in this section. In order to find the square or cube root of a decimal fraction it is easier if you convert them to a common fraction first. Once we have them in that form then we can easily determine the square or cube root.

#### EXAMPLE:

Calculate:

$$\sqrt{0,09}$$

To find the square root of 0,09 we must first convert it into a common fraction:

$$0,09 = \frac{9}{100}$$

$$\text{This means that } \sqrt{0,09} = \sqrt{\frac{9}{100}}$$

$$\therefore \frac{\sqrt{9}}{\sqrt{100}} = \frac{3}{10}$$

$$\frac{3}{10} = 0,3$$

$$\therefore \sqrt{0,09} = 0,3$$

The same method can be used when we are working with cube roots.





### EXAMPLE:

Calculate:

$$\sqrt[3]{0,008}$$

$$0,008 = \frac{8}{1\,000}$$

$$\therefore \sqrt[3]{0,008} = \frac{\sqrt[3]{8}}{\sqrt[3]{1000}}$$

$$= \frac{2}{10}$$

$$= 0,2$$

$$\therefore \sqrt[3]{0,008} = 0,2$$

### SOLVING PROBLEMS IN CONTEXT:

We will find many examples in our daily life where we are exposed to decimal fractions and using all the skills acquired in these lessons.

We will do one or two examples:

### EXAMPLE:

Mr Peters buys a radio for R206,50. The shop allows him to pay it off over six months. Calculate how much he must pay off per month rounded to the second decimal place.

### ANSWER:

$$\begin{aligned} &R206,50 \div 6 \\ &= R34,416667 \\ &= R34,42 \end{aligned}$$

### EXAMPLE:

Taylor bought 1,5 litres of milk for her 6 cats. How many litres of milk will each cat get if it is shared equally?

### ANSWER:

$$\begin{aligned} &1,5 \text{ litres} \div 6 \\ &= 0,25 \text{ litres} \end{aligned}$$

### CLASSWORK:

Work through the following exercises and write the answers in your classwork book. The answers can be found at the end of the day's lesson:



#### ACTIVITY 1:

Calculate each of the following:

a)  $0,5^2$

b)  $0,15^2$

c)  $0,4^3$

d)  $1,2^3$

#### ACTIVITY 2:

Calculate each of the following:

a)  $\sqrt{0,16}$

b)  $\sqrt{0,64}$

c)  $\sqrt[3]{0,27}$

d)  $\sqrt[3]{0,64}$

#### ACTIVITY 3:

a) You buy a six-pack of cooldrinks at the shop for R37,50.

Calculate the cost for one can of cooldrink.

b) A kilogram on bananas cost R9,95.

Calculate how much it will cost if you buy 2,25 kilograms of bananas.

### IT IS IMPORTANT TO REMEMBER:

When we square or cube decimals, we must remember that we must use the same methods we would have used if we just multiplied decimal values.



In order to find the square or cube root of a decimal fraction it is easier if you convert them to a common fraction first. Once we have them in that form then we can easily determine the square or cube root.





## HOMEWORK:

Do the following exercises, applying what you have learnt today. **FIRST ATTEMPT TO DO ALL YOUR HOMEWORK BEFORE YOU CHECK YOUR ANSWERS IN THE MEMORANDUM BELOW TODAY'S LESSON**



### QUESTION 1:

- |            |             |
|------------|-------------|
| a) $1,8^2$ | b) $2,3^2$  |
| c) $0,4^3$ | d) $0,25^3$ |

### QUESTION 2:

- |                      |                      |
|----------------------|----------------------|
| a) $\sqrt{1,44}$     | b) $\sqrt{2,25}$     |
| c) $\sqrt[3]{0,216}$ | d) $\sqrt[3]{-0,64}$ |

### QUESTION 3:

- Divide R44,45 between seven people so that each one receives the same amount.
- John saves R15,25 every week. He has saved a total of R106,75 so far. How many weeks has he been saving for?
- Paul does an experiment on the growth rate of a bean plant. He notices that the plant grows at a rate of 5,4 cm each day. How much will the plant have grown in 2 and a quarter day?



## MEMORANDUM: DAY 1:



### CLASSWORK:

#### ACTIVITY 1:

Write the following fractions as decimal fractions:

$$\begin{aligned} \text{a)} \quad & \frac{1}{2} \\ & = \frac{5}{10} \\ & = 0,5 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & \frac{7}{2} \\ & = 3\frac{1}{2} \\ & = 3\frac{5}{10} \\ & = 3,5 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & \frac{4}{5} \\ & = \frac{8}{10} \\ & = 0,8 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & \frac{32}{100} \\ & = 0,32 \end{aligned}$$

#### ACTIVITY 2:

Write the fractions as decimal fractions.

$$\begin{aligned} \text{a)} \quad & \frac{23}{100} \\ & = 0,23 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & \frac{13}{5} \\ & = 2\frac{3}{5} \\ & = 2\frac{6}{10} \\ & = 2,6 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & \frac{54}{100} \\ & = 0,54 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & \frac{125}{1\,000} \\ & = 0,125 \end{aligned}$$

$$\begin{aligned} \text{e)} \quad & \frac{13}{1\,000} \\ & = 0,013 \end{aligned}$$

$$\begin{aligned} \text{f)} \quad & \frac{26}{25} \\ & = 1\frac{1}{25} \\ & = 1\frac{4}{100} \\ & = 1,04 \end{aligned}$$

#### ACTIVITY 3:

Write the following as decimal fractions:

$$\begin{aligned} \text{a)} \quad & 2 \times 10 + 1 \times 1 + \frac{3}{10} \\ & = 20 + 1 + \frac{3}{10} \\ & = 21,3 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 3 \times 1 + 6 \times \frac{1}{100} \\ & = 3 + \frac{6}{100} \\ & = 3,06 \end{aligned}$$



## HOMEWORK:

### QUESTION 1:

Write the following fractions as decimal fractions:

$$\begin{aligned} \text{a)} \quad & \frac{1}{4} \\ & = \frac{25}{100} \\ & = 0,25 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & \frac{9}{5} \\ & = 1\frac{4}{5} \\ & = 1\frac{8}{10} \\ & = 1,8 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & \frac{3}{5} \\ & = \frac{6}{10} \\ & = 0,6 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & \frac{48}{100} \\ & = 0,48 \end{aligned}$$

### QUESTION 2:

Write the fractions as decimal fractions.

$$\begin{aligned} \text{a)} \quad & \frac{78}{100} \\ & = 0,78 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & \frac{13}{4} \\ & = 3\frac{1}{4} \\ & = 3\frac{25}{100} \\ & = 3,25 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & \frac{58}{100} \\ & = 0,58 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & \frac{364}{1000} \\ & = 0,364 \end{aligned}$$

$$\begin{aligned} \text{e)} \quad & \frac{86}{1000} \\ & = 0,086 \end{aligned}$$

$$\begin{aligned} \text{f)} \quad & \frac{36}{25} \\ & = 1\frac{11}{25} \\ & = 1\frac{44}{100} \\ & = 1,44 \end{aligned}$$

### QUESTION 3:

Write the following as decimal fractions:

$$\begin{aligned} \text{a)} \quad & 4 \times 3 + 1 \times 2 + \frac{8}{10} \\ & = 12 + 2 + \frac{8}{10} \\ & = 14,8 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 2 \times 2 + 3 \times \frac{64}{100} \\ & = 4 + \frac{192}{100} \\ & = 4 + 1,92 \\ & = 5,92 \end{aligned}$$



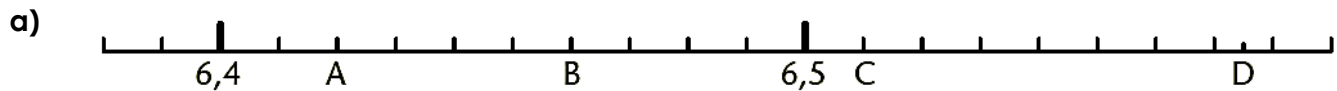
## MEMORANDUM: DAY 2:



### CLASSWORK:

#### ACTIVITY 1:

Write the values of the marked points (A – D) in as accurately as possible in decimal notation.

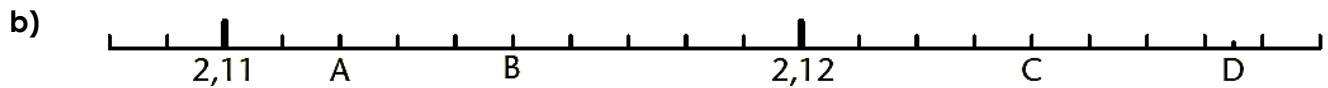


$$A = 6,42$$

$$B = 6,46$$

$$C = 6,51$$

$$D = 6,575$$

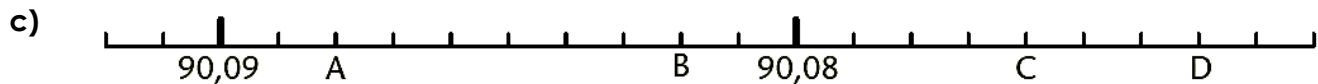


$$A = 2,112$$

$$B = 2,115$$

$$C = 2,124$$

$$D = 2,1275$$



$$A = 90,088$$

$$B = 90,082$$

$$C = 90,076$$

$$D = 90,073$$



### ACTIVITY 2:

Order the following numbers from biggest to smallest. Explain your method.

$0,8 = \mathbf{0,800}$

$\mathbf{0,465}$

$\mathbf{0,901}$

$\mathbf{0,025}$

$0,36 = \mathbf{0,360}$

$0,79 = \mathbf{0,790}$

$0,9 = \mathbf{0,900}$

$0,05 = \mathbf{0,050}$

$\mathbf{0,009}$

0,901

0,900

0,800

0,790

0,465

0,360

0,050

0,025

0,009

First convert all the decimal fractions so that they all have the same number of decimal places. You can then compare them by seeing whose first decimal is the biggest, if the first decimal place is the same then you look at the decimal place etc..

### ACTIVITY 3:

The following table gives information about two-time world-champion heavyweight boxers. If they fight against one another, who would you expect to have the advantage, and why?

	<b>Wladimir Klitschko</b>	<b>Alexander Povetkin</b>
<b>Height (m)</b>	1,98	1,88
<b>Weight (kg)</b>	112	103,3
<b>Reach (m)</b>	2,03	1,91

Wladimir Klitschko will have the advantage. His height, weight and reach is bigger than his opponent.

### ACTIVITY 4:

Copy and fill in  $<$ ,  $>$  or  $=$ .

**a)**  $3,08 < 3,8$

**b)**  $4,876 > 4,099$

**c)**  $2,75 > 2,689$

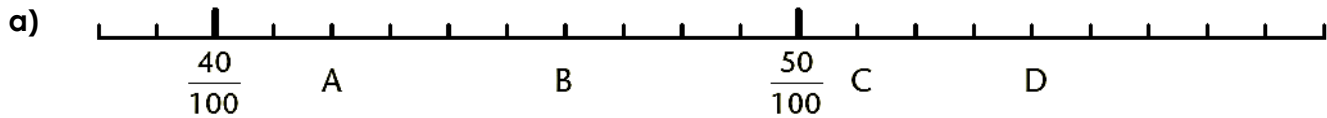
**d)**  $123,321 > 123,3$



## HOMEWORK:

### QUESTION 1:

Write the values of the marked points (A – D) in as accurately as possible in decimal notation.

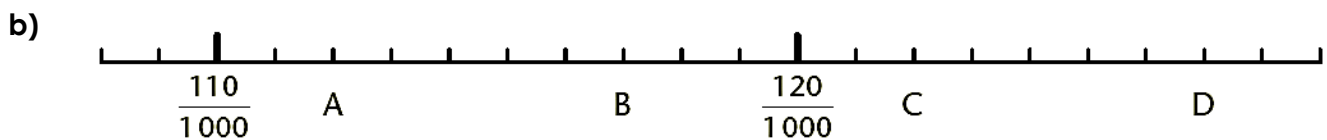


$$A = 0,42$$

$$B = 0,46$$

$$C = 0,51$$

$$D = 0,54$$

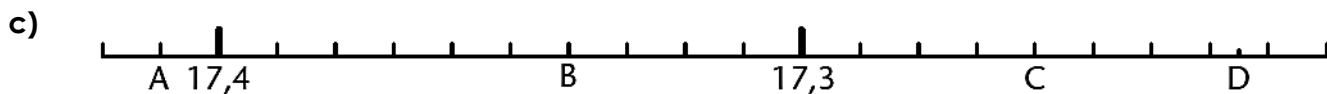


$$A = 0,112$$

$$B = 0,117$$

$$C = 0,122$$

$$D = 0,127$$



$$A = 17,41$$

$$B = 17,34$$

$$C = 17,26$$

$$D = 17,225$$

### QUESTION 2:

Order the following numbers from biggest to smallest. Explain your method.

**0,925**

**0,012**

**0,125**

0,87 = **0,870**

**0,637**

0,01 = **0,010**

0,62 = **0,620**

0,9 = **0,900**

**0,871**

0,925

0,900

0,871

0,870

0,637

0,620

0,125

0,012

0,010

First convert all the decimal fractions so that they all have the same number of decimal places. You can then compare them by seeing whose first decimal is the biggest, if the first decimal place is the same then you look at the decimal place etc..





### QUESTION 3:

Copy and fill in  $<$ ,  $>$  or  $=$ .

a)  $0,45 < 0,451$

b)  $-0,561 < -0,56$

c)  $0,23 < 0,231$

d)  $1,211 > 1,21$

## MEMORANDUM: DAY 3:



### CLASSWORK:



#### ACTIVITY 1:

Round each of the following to the nearest whole number.

a) 29,34

= 29

b) 14,452

= 14

c) 39,8

= 40

d) 1,09

= 1



#### ACTIVITY 2:

Round each of the following numbers off to one decimal place.

a) 18,59

= 18,6

b) 5,496

= 5,5

c) 6,089

= 6,1

d) 421,34

= 421,3

#### ACTIVITY 3:

Round each of the following numbers off to two decimal places:

a) 8,345

= 8,35

b) 5,595

= 5,60

c) 21,879

= 21,88

d) 67,692

= 67,70

### HOMEWORK:

#### QUESTION 1:

Round each of the following to the nearest whole number.

a) 15,59

= 16

b) 19,9

= 20

c) 40,63

= 41

d) 10,29

= 10



### QUESTION 2:

Round each of the following numbers off to one decimal place.

a) 5,982  
= 6,0

b) 7,394  
= 7,4

c) 7,349  
= 7,3

d) 1 000,329  
= 1 000,3

### QUESTION 3:

Round each of the following numbers off to two decimal places:

a) 5,3726  
= 5,37

b) 9,439  
= 9,44

c) 28,125  
= 28,13

d) 14,033  
= 14,03

## MEMORANDUM: DAY 4:



### CLASSWORK:



### ACTIVITY 1:



Calculate each of the following:

a) 
$$\begin{array}{r} 16,52 \\ + 09,38 \\ \hline = 25,90 \end{array}$$

b) 
$$\begin{array}{r} 16,52 \\ + 09,78 \\ \hline = 26,30 \end{array}$$

c) 
$$\begin{array}{r} 30,08 \\ + 02,90 \\ \hline = 32,98 \end{array}$$

d) 
$$\begin{array}{r} 9,99 \\ + 0,99 \\ \hline = 10,98 \end{array}$$

## ACTIVITY 2:

Calculate each of the following:

$$\begin{array}{r} \text{a)} \quad 45,67 \\ - 23,80 \\ \hline = 21,87 \end{array}$$

$$\begin{array}{r} \text{b)} \quad 1,009 \\ - 0,998 \\ \hline = 0,011 \end{array}$$

$$\begin{array}{r} \text{c)} \quad 0,900 \\ - 0,045 \\ \hline = 0,855 \end{array}$$

$$\begin{array}{r} \text{d)} \quad 65,7 \\ - 37,6 \\ \hline = 28,1 \end{array}$$

## ACTIVITY 3:

Calculate each of the following:

$$\begin{aligned} \text{a)} \quad & 0,12 \times 0,3 \\ & = (0,12 \times 100) \times (0,3 \times 10) \\ & = 12 \times 3 \\ & = 36 \div 100 \div 10 \\ & = 0,036 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 350 \times 0,043 \\ & = 350 \times (0,043 \times 1\,000) \\ & = 350 \times 43 \\ & = 15\,050 \div 1\,000 \\ & = 15,05 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & 1,2 \times 0,3 \\ & = (1,2 \times 10) \times (0,3 \times 10) \\ & = 12 \times 3 \\ & = 36 \div 10 \div 10 \\ & = 0,36 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & 0,13 \times 1,6 \\ & = (0,13 \times 100) \times (1,6 \times 10) \\ & = 13 \times 16 \\ & = 208 \div 100 \div 10 \\ & = 0,208 \end{aligned}$$

## ACTIVITY 4:

Calculate each of the following:

$$\begin{aligned} \text{a)} \quad & 62,5 \div 2,5 \\ & = (62,5 \times 10) \div (2,5 \times 10) \\ & = 625 \div 25 \\ & = 25 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 6,25 \div 2,5 \\ & = (6,25 \times 100) \div (2,5 \times 100) \\ & = 625 \div 250 \\ & = 2,5 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & 6,25 \div 0,25 \\ & = (6,25 \times 100) \div (0,25 \times 100) \\ & = 625 \div 25 \\ & = 25 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & 0,625 \div 2,5 \\ & = (0,625 \times 1\,000) \div (2,5 \times 1\,000) \\ & = 625 \div 2\,500 \\ & = 0,25 \end{aligned}$$



## HOMEWORK:

### QUESTION 1:

Calculate each of the following:

$$\begin{array}{r} \text{a)} \quad 12,67 \\ + 04,76 \\ \hline = \mathbf{17,43} \end{array}$$

$$\begin{array}{r} \text{b)} \quad 157,90 \\ + 002,48 \\ \hline = \mathbf{160,38} \end{array}$$

$$\begin{array}{r} \text{c)} \quad 13,490 \\ + 00,976 \\ \hline = \mathbf{14,466} \end{array}$$

$$\begin{array}{r} \text{d)} \quad 10,010 \\ + 02,538 \\ \hline = \mathbf{12,548} \end{array}$$

### QUESTION 2:

Calculate each of the following:

$$\begin{array}{r} \text{a)} \quad 18,08 \\ - 03,87 \\ \hline = \mathbf{14,21} \end{array}$$

$$\begin{array}{r} \text{b)} \quad 18,98 \\ - 08,96 \\ \hline = \mathbf{10,02} \end{array}$$

$$\begin{array}{r} \text{c)} \quad 32,650 \\ - 07,342 \\ \hline = \mathbf{25,308} \end{array}$$

$$\begin{array}{r} \text{d)} \quad 8,965 \\ - 4,236 \\ \hline = \mathbf{4,729} \end{array}$$

### QUESTION 3:

Calculate each of the following:

$$\begin{aligned} \text{a)} \quad & 1,2 \times 0,35 \\ & = (1,2 \times 10) \times (0,35 \times 100) \\ & = 12 \times 35 \\ & = 420 \div 10 \div 100 \\ & = 0,420 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 5,9 \times 0,42 \\ & = (5,9 \times 10) \times (0,42 \times 100) \\ & = 59 \times 42 \\ & = 2\,478 \div 10 \div 100 \\ & = 2,478 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & 3,25 \times 0,75 \\ & = (3,25 \times 100) \times (0,75 \times 100) \\ & = 325 \times 75 \\ & = 24\,375 \div 100 \div 100 \\ & = 2,4375 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & 0,15 \times 6,5 \\ & = (0,15 \times 100) \times (6,5 \times 10) \\ & = 15 \times 65 \\ & = 975 \div 100 \div 10 \\ & = 0,975 \end{aligned}$$



### QUESTION 4:

Calculate each of the following:

$$\begin{aligned} \text{a)} \quad & 6,3 \div 0,21 \\ & = (6,3 \times 100) \div (0,21 \times 100) \\ & = 630 \div 21 \\ & = 30 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & 5,5 \div 0,25 \\ & = (5,5 \times 100) \div (0,25 \times 100) \\ & = 550 \div 25 \\ & = 22 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 3,75 \div 0,5 \\ & = (3,75 \times 100) \div (0,5 \times 100) \\ & = 375 \div 50 \\ & = 7,5 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & 36 \div 0,2 \\ & = (36 \times 10) \div (0,2 \times 10) \\ & = 360 \div 2 \\ & = 180 \end{aligned}$$

### MEMORANDUM: DAY 5:



### CLASSWORK:

#### ACTIVITY 1:

Calculate each of the following:

$$\begin{aligned} \text{a)} \quad & 0,5^2 \\ & = 0,5 \times 0,5 \\ & = (0,5 \times 10) \times (0,5 \times 10) \\ & = 5 \times 5 \\ & = 25 \div 10 \div 10 \\ & = 0,25 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & 0,4^3 \\ & = 0,4 \times 0,4 \times 0,4 \\ & = (0,4 \times 10) \times (0,4 \times 10) \times (0,4 \times 10) \\ & = 4 \times 4 \times 4 \\ & = 64 \div 10 \div 10 \div 10 \\ & = 0,064 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 0,15^2 \\ & = 0,15 \times 0,15 \\ & = (0,15 \times 100) \times (0,15 \times 100) \\ & = 15 \times 15 \\ & = 225 \div 100 \div 100 \\ & = 0,0225 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & 1,2^3 \\ & = 1,2 \times 1,2 \times 1,2 \\ & = (1,2 \times 10) \times (1,2 \times 10) \times (1,2 \times 10) \\ & = 12 \times 12 \times 12 \\ & = 1\,728 \div 10 \div 10 \div 10 \\ & = 1,728 \end{aligned}$$

## ACTIVITY 2:

Calculate each of the following:

$$\begin{aligned} \text{a)} \quad & \sqrt{0,16} \\ &= \sqrt{\frac{16}{100}} \\ &= \frac{\sqrt{16}}{\sqrt{100}} \\ &= \frac{4}{10} \\ &= 0,4 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & \sqrt{0,64} \\ &= \sqrt{\frac{64}{100}} \\ &= \frac{\sqrt{64}}{\sqrt{100}} \\ &= \frac{8}{10} \\ &= 0,8 \end{aligned}$$

$$\begin{aligned} \text{c)} \quad & \sqrt[3]{0,27} \\ &= \sqrt[3]{\frac{27}{1000}} \\ &= \frac{\sqrt[3]{27}}{\sqrt[3]{1000}} \\ &= \frac{3}{10} \\ &= 0,3 \end{aligned}$$

$$\begin{aligned} \text{d)} \quad & \sqrt[3]{0,64} \\ &= \sqrt[3]{\frac{64}{1000}} \\ &= \frac{\sqrt[3]{64}}{\sqrt[3]{1000}} \\ &= \frac{4}{10} \\ &= 0,4 \end{aligned}$$

## ACTIVITY 3:

- a) You buy a six-pack of cooldrinks at the shop for R37,50.  
Calculate the cost for one can of cooldrink.

$$\begin{aligned} &= R37,50 \div 6 \\ &= R6,25 \text{ per can} \end{aligned}$$

- b) A kilogram on bananas cost R9,95.  
Calculate how much it will cost if you buy 2,25 kilograms of bananas.

$$\begin{aligned} &= R9,95 \times 2,25 \\ &= R22,3875 \\ &= R22,39 \end{aligned}$$

## HOMEWORK:

### QUESTION 1:

Calculate each of the following:

$$\begin{aligned} \text{a)} \quad & 1,8^2 \\ &= 1,8 \times 1,8 \\ &= (1,8 \times 10) \times (1,8 \times 10) \\ &= 18 \times 18 \\ &= 324 \div 10 \div 10 \\ &= 3,24 \end{aligned}$$

$$\begin{aligned} \text{b)} \quad & 2,3^2 \\ &= 2,3 \times 2,3 \\ &= (2,3 \times 10) \times (2,3 \times 10) \\ &= 23 \times 23 \\ &= 529 \div 10 \div 10 \\ &= 5,29 \end{aligned}$$



$$\begin{aligned}
 \text{c)} \quad & 0,4^3 \\
 & = 0,4 \times 0,4 \times 0,4 \\
 & = (0,4 \times 10) \times (0,4 \times 10) \times (0,4 \times 10) \\
 & = 4 \times 4 \times 4 \\
 & = 64 \div 10 \div 10 \div 10 \\
 & = 0,064
 \end{aligned}$$

$$\begin{aligned}
 \text{d)} \quad & 0,25^3 \\
 & = 0,25 \times 0,25 \times 0,25 \\
 & = (0,25 \times 100) \times (0,25 \times 100) \times (0,25 \times 100) \\
 & = 25 \times 25 \times 25 \\
 & = 15\,625 \div 100 \div 100 \div 100 \\
 & = 0,015625
 \end{aligned}$$

### QUESTION 2:

Calculate each of the following:

$$\begin{aligned}
 \text{a)} \quad & \sqrt{1,44} \\
 & = \sqrt{\frac{144}{100}} \\
 & = \frac{\sqrt{144}}{\sqrt{100}} \\
 & = \frac{12}{10} \\
 & = 1,2
 \end{aligned}$$

$$\begin{aligned}
 \text{b)} \quad & \sqrt{2,25} \\
 & = \sqrt{\frac{225}{100}} \\
 & = \frac{\sqrt{225}}{\sqrt{100}} \\
 & = \frac{15}{10} \\
 & = 1,5
 \end{aligned}$$

$$\begin{aligned}
 \text{c)} \quad & \sqrt[3]{0,216} \\
 & = \sqrt[3]{\frac{216}{1\,000}} \\
 & = \frac{\sqrt[3]{216}}{\sqrt[3]{1\,000}} \\
 & = \frac{6}{10} \\
 & = 0,6
 \end{aligned}$$

$$\begin{aligned}
 \text{d)} \quad & \sqrt[3]{-0,64} \\
 & = \sqrt[3]{\frac{-64}{1\,000}} \\
 & = \frac{\sqrt[3]{-64}}{\sqrt[3]{1\,000}} \\
 & = \frac{-4}{10} \\
 & = -0,4
 \end{aligned}$$

### QUESTION 3:

Calculate each of the following:

**a)** Divide R44,45 between seven people so that each one receives the same amount.

$$\begin{aligned}
 & = R44,45 \div 7 \\
 & = R6,35
 \end{aligned}$$

**b)** John saves R15,25 every week. He has saved a total of R106,75 so far.

How many weeks has he been saving for?

$$\begin{aligned}
 & = R106,75 \div R15,25 \\
 & = 7 \text{ weeks}
 \end{aligned}$$

**c)** Paul does an experiment on the growth rate of a bean plant. He notices that the plant grows at a rate of 5,4 cm each day. How much will the plant have grown in 2 and a quarter day?

$$\begin{aligned}
 & = 5,4 \times 2,25 \\
 & = 12,15 \text{ cm}
 \end{aligned}$$