GRADE 7 MATHS TERM 1

Contents

WHOLE NUMBERS

All the positive numbers 1; 2; 3; 4; … are called the set of natural numbers. If we include 0 in the set of natural numbers, we get the set of counting numbers or whole numbers. We use numbers to add, subtract, multiply and divide. We can also write numbers in a particular order, from largest to smallest, e.g., 124; 1124; 5124; 9124. When we need to estimate, we can round off numbers to the nearest 5, 10, 100 or 1000.

Whole numbers – or counting numbers are the numbers, 0; 1; 2; 3; 4; … and are represented by the symbol N_o.

Natural numbers – are whole numbers greater than or equal to 1: (1; 2; 3; 4; …) and are represented by the symbol N.

Rounding off to the nearest 5:

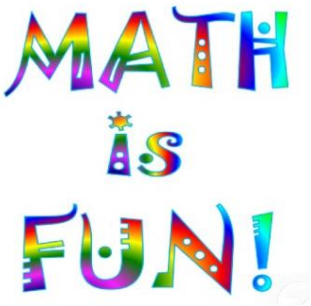
Look at the last digit of the number (the units digit) and round the number off to the closest number that 5 divides into.

1; 2 – "Move back to number ending in 0"

3; 4 – "Move forward to the number ending in 5"

6; 7 - "Move back to number ending in 5"

8; 9 - "Move forward to the number ending in 0"



Round off a number to the nearest 10:

When rounding off to the nearest 10, look at the units- digit.

Underline the Tens digit - 5**8**6

Look at the digit to the RIGHT of the Tens digit - 58**6**

If this digit is 0, 1, 2, 3, or 4, the Tens stay the same. This is called rounding down.

If this digit is 5, 6, 7, 8 or 9, round up. This is called rounding up.

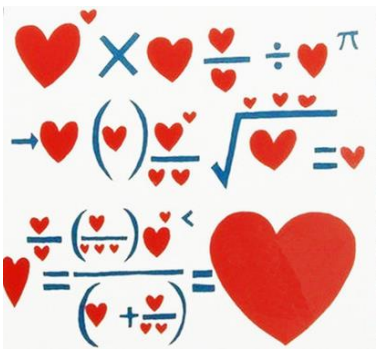
586 rounded to the nearest 10 is 590.

We use the same method to round off to 100 (look at the tens digit) and 1000 (look at the hundreds digit)

For example: 465 78**4** rounded off to the nearest 10 is 465 780.

465 7**8**4 rounded to the nearest 100 is 465 800.

465 **7**84 rounded to the nearest 1000 is 466 000.



Try this:

Round off 987 516 to:

a) The nearest 5

b) The nearest 10

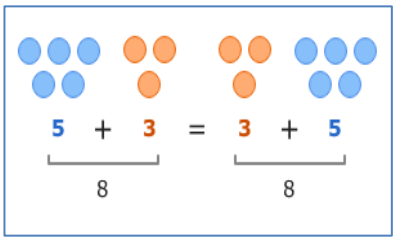
c) The nearest 100

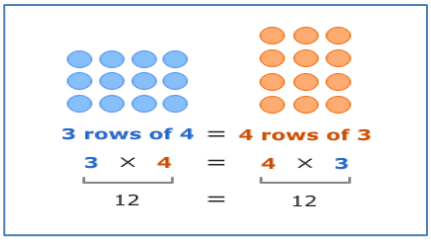
d) The nearest 1000

PROPERTIES OF WHOLE NUMBERS

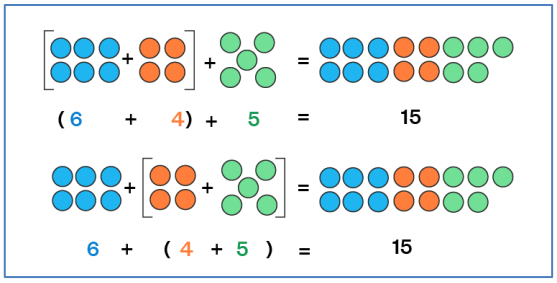
Adding numbers is called finding the **sum**, and subtracting numbers is called finding the **difference**. Multiplying numbers is called finding the **product** and dividing numbers is called finding the **quotient**.

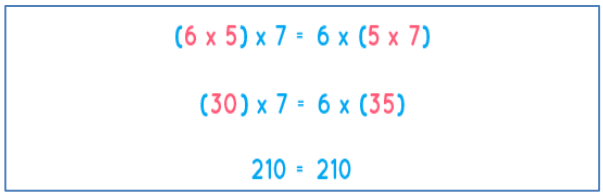
When you add or multiply numbers, the order of the numbers does not matter, for example: 4 + 5 = 5 + 4 and 4 x 5 = 5 x 4. This is called the **commutative property** of addition and multiplication.





The order in which you add or multiply numbers also does not matter, for example: (4+5) +6 = 4 + (5+6) and (4x5) x6 = 4 x (5x6). This is called the **associative property** of addition and multiplication.





DISTRIBUTIVE, ASSOCIATIVE AND COMMUTATIVE PROPERTY

a) 2 x 5 + 2 x 6 – 2 x 7

= 2 x (5 + 6 - 7)

= 2 x 4

= 8

b) 123 x 7

=(100 + 20 + 3) x 7

=(100 x 7)+(20 x 7)+(3 x 7)

= 700 + 140 + 21

= 861

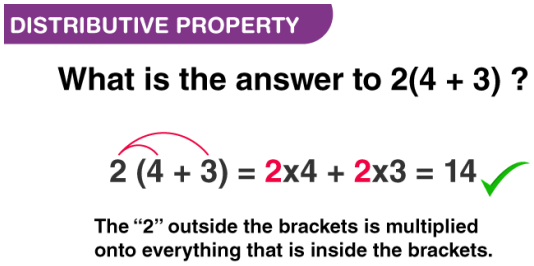
c) 12(6 + 7)

= 12 x 6 + 12 x 7

= 72 + 84

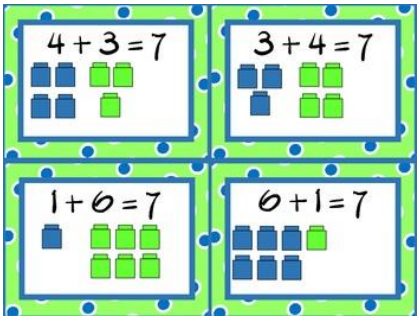
= 156

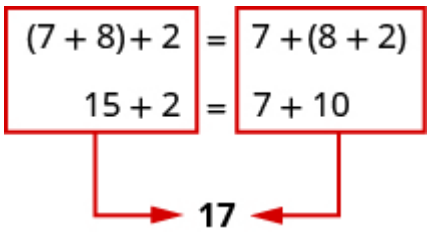
When numbers in brackets are multiplied by a number in front of the brackets, each number inside the brackets is affected. This property of numbers works for addition and subtraction, for example: 4(5 + 6) = (4 x 5) + (4 x 6) or 6(5 – 4) = (6 x 5) - (6 x 4). This property is called the **distributive property** of multiplication.



Addition and subtraction are called **inverse operations**. If you add and subtract the same amount from a number, you end up back where you started. These operations have an effect on each other, for example: 856 + 12 – 12 = 856.

Multiplication and division are called **inverse operations**. If you multiply and divide a number by the same amount, you end up back where you started as the operations have an inverse effect on each other, for example: 524 x 12 ÷ 12 = 524.

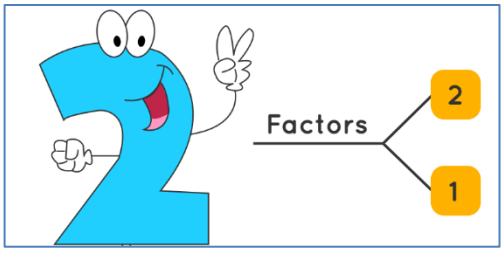




MULTIPLES AND FACTORS

Factors

A factor is a number that divides exactly into a whole number without any remainders. F_{10} = {1; 2; 5; 10}

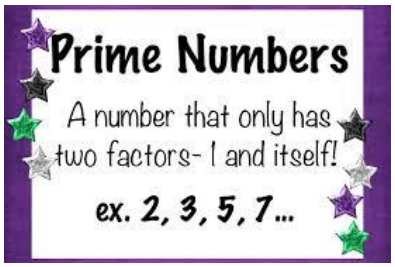


Prime numbers

A prime number has only 2 factors: 1 and itself. The number 2 is the first prime number. We say that 2 x 1 = 2. The number 2 is the only even prime number as all other numbers have more than two factors. The numbers 2; 3; 5; 7 and 11 are examples of prime numbers because they have only two factors, the number itself and 1.

e.g. $F_3 = \{1; 3\}$

3 is therefore a prime number.

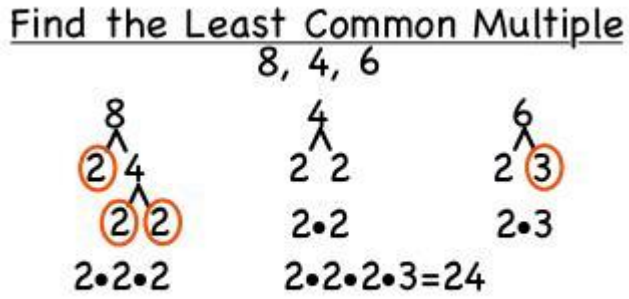


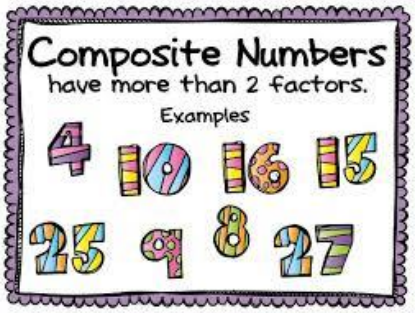
Multiples

A multiple is the product of two natural numbers. For example, 24 is multiple of 8 and 3 because 8 x 3 =24. The number 24 is also a multiple of 12 and 2 because 12 x 2 = 24.

Multiplication Tables: M

Multiplication Tables. $M_7 = \{7; 14; 21; 28 \ldots.\}$





Composite numbers

A composite number has more than 2 factors.

e.g. $F_{20} = \{1; 2; 4; 5; 10; 20\}$

Exercise 1

1. Why is the number 1 neither a prime nor a composite number?
2. **Write down the following sets of numbers:**

a) Odd numbers between 100 and 120.

b) Even numbers from 364 to 372.

c) Prime numbers greater than 5 but smaller than 27.

d) Multiples of 8 from 48 to 80.

e) The factors of 36.

f) The first 5 counting numbers.

g) The first 5 natural numbers.

h) The prime factors of 30.

3. Write down ALL the factors of the following numbers:

a) 25

b) 48

4. Write down the first 6 multiples of the following:

a) 10

b) 25

5. Solve the problems below by first rounding off each number to the nearest 10 000.

a) 171 643 + 16 124

b) 399 106 + 71 257 + 9 199

6. Use the same method again but, round off these numbers to the nearest 100:

a) 9 876 543 – 210 369

b) 12 413 x 125

7. Use the same method again but, round off these numbers to the nearest 10:

a) 8 342 x 29

b) 211 x 43

Exercise 2

1. What rule is being used in each of these equations: commutative, associative or distributive?

a) 2(5 – 3) = (2 x 5) - (2 x 3)

b) 3 + 7 = 7 + 3

c) 2 x (3 x 4) = (2 x 3) x 4

d) 5(7 + 6) = (5 x 7) + (5 x 6)

e) (7 + 9) + 4 = 7 + (9 + 4)

f) 4 x 7 = 7 x 4

Multiplication and Division

Examples: Multiplication

Calculate 2310 x 35

Answers:

2310 x 35 = 2310 x (30 + 5)

= (231 x 30) + (2310 x 5) Distributive law

= (2310 x 5) + (2310 x 30) Commutative law

= 11550 =69 300

= 80850

In columns, it looks like this:

2310	
x 35	
11 550	2310 x 5, multiply by units
+ 69 300	2310 x 30, multiply by tens
80 850	Add the two products together

Division

When we divide large numbers, we use a method called **long division.**

Example:

453	This number is the answer
321 ⟌ 145413	
1284 ↓	321 x 4 = 1284
1701	Subtract 1284 from 1454 and bring down the 1
1605 ↓	321 x 5 = 1605
963	Subtract 1605 from 1701 and bring down the 3
963	321 x 3 = 963
0	Subtract 963 from 963

Exercise 3

Do these calculations. Show your method. Not just an answer.

a) 432 128 - 248 529

b) 164 600 + 196 416

c) 35 x 78

d) 5 822 ÷ 16

e) 80 357 + 619 450

f) 231 609 – 218 344

g) 27 x 39

h) 9 206 ÷ 28

Exercise 4

1. **Use the HORIZONTAL METHOD**

a) 456 +350 + 239

b) 648 + 352 + 371

2**. Use the VERTICAL METHOD**

a) 1 226 x 82

b) 3 437 x 24

HCF and LCM

The **HCF** and **LCM** are numbers that share the same factors. These are called common factors and you can find the **highest common factor, HCF**, of two or more numbers.
You can also find the **lowest common multiple, LCM**, of two or more numbers.

Example:

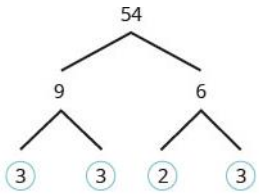
The multiples of 12 are 12 ; 24; 36; 48; **60**; 72 ; 84; … and the multiples of 15 are 15; 30; 45; **60**; 75; 90; …which means that the LCM of 12 and 15 is **60.**

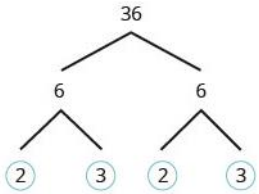
You can use the prime factor method for finding the LCM (or an HCF).

For example:

12 = 2 x 2 x 3 and 15 = 3 x 5 so the LCM is 2 x 2 x 3 x 5 which contains all possible prime factors of both numbers. The HCF of 12 and 15 is 3 as that is the highest factor common to both numbers.

Use prime factors to write numbers in the Factor tree method





Use prime factors to write numbers in exponential form (Ladder method)

72

2	72
2	36
2	18
3	9
3	3
	1

$72 = 2 \times 2 \times 2 \times 3 \times 3$

$= 2^3 \times 3^2$

Exercise 5

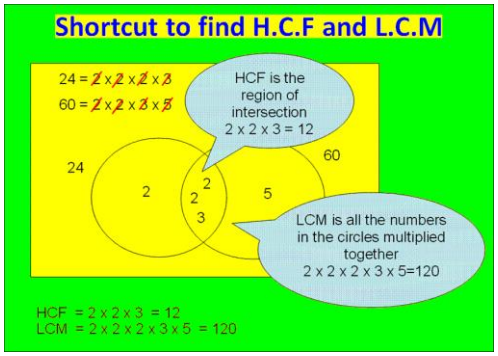
Write in exponential form using only prime numbers as bases. (Ladder Method)

a) 125
b) 256
c) 200
d) 275
e) 588
f) 576
g) 42
h) 484
i) 1125

Exercise 6

1. Find the HCF of:

a) 6 and 9:	
b) 14 and 18:	
c) 30 and 24:	
d) 15 and 10:	



2. Find the LCM of:

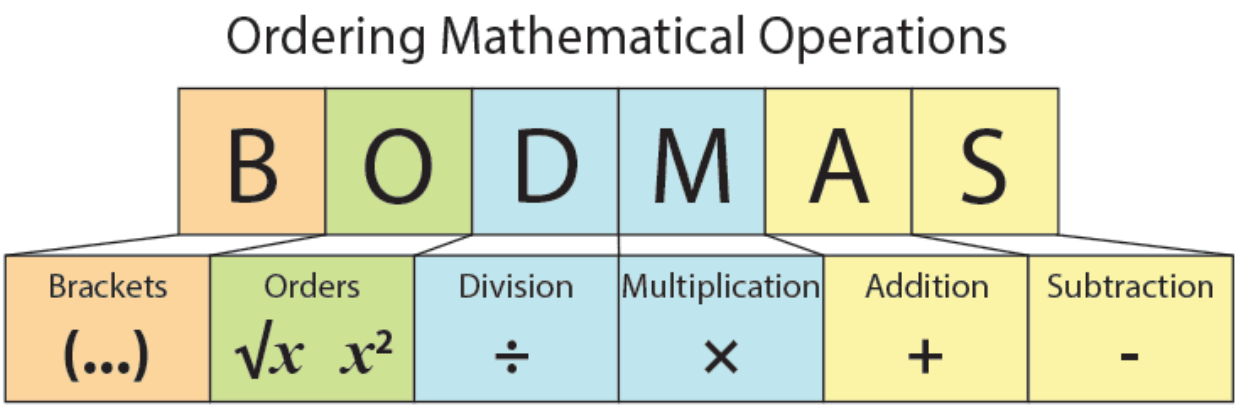
a) 5 and 3:	
b) 9 and 6:	
c) 8 and 10:	
d) 12 and 9:	
e) 15 and 20:	

Exercise 7

BODMAS stands for **Brackets, Of, Division, Multiplication, Addition, and Subtraction**.

BODMAS is the order of operation of a mathematical expression.

BODMAS is an acronym to remember the order of mathematical operations – the correct order in which to solve Mathematics problems.



Complete the sums below using **BODMAS/BOMDAS.**

No CALCULATORS are allowed. Show all working out.

a) 30 X 12 ÷ 4 + ¾ 0f 20

b) (17 x 25) x (24 ÷ 2) – 10 x 10

c) (24 – 14) x 25 ÷ 5

d) 235 + 80 x 50 ÷ 10 – (215 + ¾ of 8)

e) 200 ÷ 20 + 285 ÷ 95 – 8 + 4

f) 790 + 1 000 ÷ 125 – 50 ÷ 10

g) 50 + $\frac{3}{5}$ of 75 – 32

h) 470 + 692 x 10 ÷ 20 – 630

PROBLEM SOLVING: BRAIN TEASER

Two lighthouse beacons can be seen from the top of a hill. These two beacons start flashing at the same time. One beacon flashes every 4 minutes and the other flashes every 9 minutes.

Calculate how long it will be before they both flash at the same time again. Use your 4 x and 9 x table to calculate.

Exercise 8

There are special rules that apply to the number zero and the number one.

1. What happens to numbers when you multiply or divide by 1?

Solve these problems.

a) 28×1 =

b) 28÷1 =

c) 8 344×1 =

d) 8 344÷1 =

e) What can you conclude about multiplying or dividing by 1?

2. What happens to numbers when you add or subtract 0?

Solve these problems.

a) 429+0 =

b) 429−0 =

c) 5 360+0 =

d) What can you conclude about adding or subtracting 0.

3. What happens when we multiply by 0?

a) What does it mean when we say 4×0?

4. What happens when we divide 0 by a whole number?

a) 0÷4

b) 0÷8

c) 0÷58

d) 0÷347

5. What happens when we divide by zero?

a) 4÷0

b) 8÷0

c) 58÷0

d) 347÷0

RATIO AND RATE

RATIO

- A ratio is used to compare the sizes of two or more quantities that use the same unit of measurement.
- A ratio of 5:6 means that for every 5 of the first quantity, there are 6 of the second quantity.
- Ratio can also be written as a fraction. In the ratio 5:6, the first quantity would be written as $\frac{5}{11}$. The second quantity would be written as$\frac{6}{11}$.
- Ratios can be simplified, e.g., 10:12 can be simplified to 5:6.
- Another example: The ratio of an original price of a coat to the sale price is R300:R210. We simplify this to 10:7

RATE

A rate is used to compare the sizes of two or more quantities that use different units of measurement, e.g., hours (h), minutes (m), Rands (R), millimeters (mm), centimeters (cm), etc.

Exercise 9

1. Simplify the ratio 32:16.
2. Write the fraction 32 /48 in its simplest form.
3. Now write the ratio 32:48 in its simplest form.
4. The ratio of women engineers to men engineers in a construction company is 2:7.

a) There are six women engineers. How many men engineers are there in the company?

b) How many engineers are there in the company altogether?

c) What fraction of the total number of engineers are women?

d) The company decides to improve their gender equality. The company wants to change the ratio of women engineers to men engineers to 2:5. The company cannot afford to employ more than 28 engineers in total. When the company achieves this ratio, how many women engineers and men engineers would they have?

SHARING A "WHOLE" IN A GIVEN RATIO

Share R 2 250,00 in the ratio 3:2:1

- This means 3:2:1 that 3+2+1= 6 parts of the whole 2 250.
- In fraction form, this means $\frac{3}{6}$ of 2 250

  = 3 x 2 250

  = 6 750 ÷ 6

  = R 1 125
- $\frac{2}{6}$ of 2 250

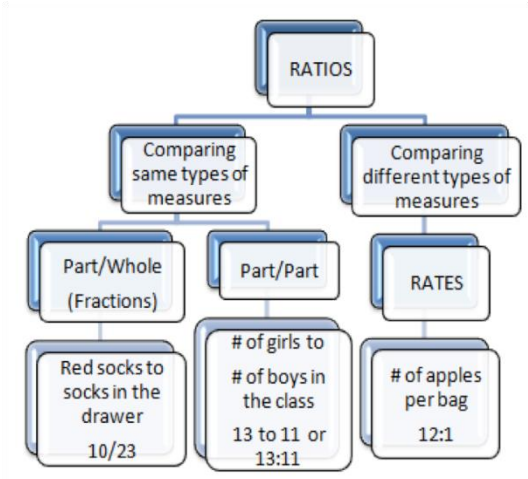
  = 2 x 2 250

  = 4 500 ÷ 6

  = R 750
- $\frac{1}{6}$ of 2 250

  = 2 250 ÷ 6

  = R 375



Exercise 10

1. Divide R 200,00 between you and your best friend in the ratio 3:2
2. Divide R 240,00 in the ratio 3:4:5
3. Share 28 sweets between Joe and Amy in the ratio 3:1
4. Share an inheritance of R 50 000,00 between five children in the following ratio 7:9:3:2:4

CALCULATING PERCENTAGE INCREASE AND DECREASE

When increasing or decreasing a number by a given percentage, write the percentage out of 100 and multiply it by the given number.

Example: Increase R 1 500 by 25%

$= \frac{25}{100} \times \frac{1500}{1}$ *Simplify / Cancel if possible

= R 375

Now <u>add</u> this amount to the original value:

i.e. R1500+R375

= R 1 875

- If decreasing, you would <u>subtract</u> this amount from the original value.

Example: Decrease R 3 000 by 45%

$= \frac{45}{100} \times \frac{3000}{1}$

= R 1 350

Decreased amount: R3000–R1350

= R1650

Exercise 11

1. Rod decides to give his staff a 12% increase on their salaries.

These are the salaries of some of the staff before their increase. What will their salary be after the increase?

a) R11 800

b) R27 540

c) R4 400

2. Given below are the prices for three items with the same content but different weight and price. Determine which of the three would be the least expensive to purchase.

a) Sugar: 500g – R5.65;1kg – R11.90; 2kg – R18.99

b) Coffee: 50g – R54.90;100g – R75.80;200g – R99.00

c) Eggs: 6 – R11.40; 12 – R18.80; 30 – R31.99

d) Cereal: 350g – R24.99; 500g – R28.00; 400g – R26.50

3. Give the rate for each of these statements below:

a) A bus travels 480km in 8 hours. (km/h)

b) 12 apples for R 7,20 (R/apple)

c) A tap dripped 300ml of water in half an hour (ml/minute)

d) 19,95 Gigabytes transferred in 19 minutes (Gb/minute)

FRACTIONS: PROPER AND IMPROPER FRACTIONS

A fraction is a portion of a whole that has been divided into equal parts.

A **common fraction** is written as ½ or ¼ or ¾.

The number at the top represents a whole number called the **numerator** and the number at the bottom represents a whole number called the **denominator**.

In **proper fractions**, the numerator of the fraction is smaller than the denominator.

In **improper fractions**, the numerator of the fraction is bigger than the denominator.

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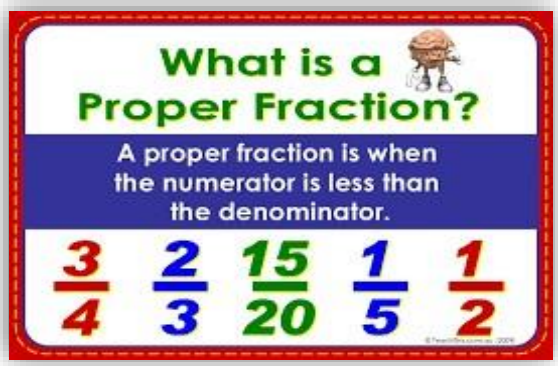
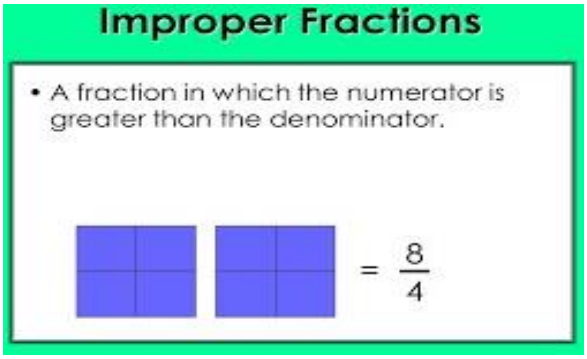


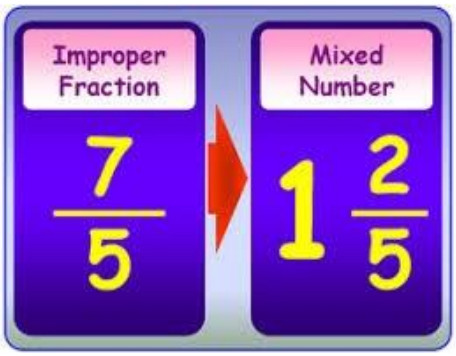


MIXED NUMBERS

Sometimes we write an improper fraction as a mixed number, for example:

We would write $\frac{8}{5}$ as $1\frac{3}{5}$

The mixed number has a whole number part and a fraction part.



CONVERTING FRACTIONS

To convert an improper fraction to a mixed number, simply divide the number by the denominator:

Example:

$\frac{12}{5}$ = 12 ÷ 5 = 2 r 2

We write this as $2\frac{2}{5}$

To convert a mixed number to an improper fraction, multiply the whole number by the denominator. Add the numerator to this. Write this answer as the numerator and keep the denominator the same.

Examples:

8 ½ = Multiply 8 by 2, and then add 1

This will give you a total of 17

The improper fraction will therefore be $\frac{17}{2}$

Exercise 12

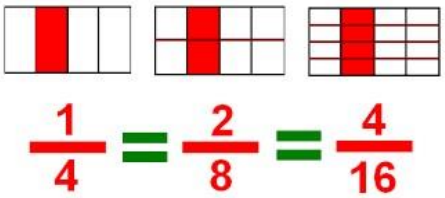
1. **Convert the improper fractions to mixed numbers:**

$\frac{41}{9}$ $\frac{316}{3}$ $\frac{199}{10}$ $\frac{412}{15}$ $\frac{1000}{125}$

2. **Convert the mixed numbers to improper fractions:**

$13\frac{2}{3}$; $17\frac{8}{11}$; $4\frac{3}{7}$; $6\frac{4}{15}$; $9\frac{7}{12}$

Equivalent fractions



SIMPLIFYING FRACTIONS

To simplify a fraction, you must reduce the fraction to its smallest form.

To do this, you need to divide both the numerator and the denominator by the same highest common factor.

Example: $\frac{12}{30} = *$

The highest number that can fit into both 12 and 30 is 6.

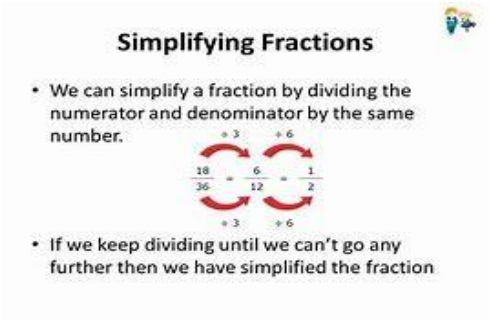
6 is therefore the highest common factor (HCF)

Divide the numerator and denominator by the highest common factor.

e.g. $\frac{12}{30} \div \frac{6}{6} = \frac{2}{5}$

SO: $\frac{12}{30} = \frac{2}{5}$

NB: A common fraction must always be written in the simplest form!



Exercise 13

1. **Equivalent fractions**

a) $\frac{30}{35} = \frac{*}{7}$

b) $\frac{11}{44} = \frac{1}{*}$

c) $\frac{63}{90} = \frac{7}{*}$

d) $\frac{9}{11} = \frac{99}{*}$

2. Simplifying fractions

$\frac{18}{90}$; $3\frac{25}{45}$; $9\frac{46}{112}$; $5\frac{24}{60}$

FRACTIONS OF QUANTITIES

When asked to work out a fraction of a quantity, use one of the following methods:

Method 1:

$\frac{1}{10}$ of 30 (Bodmas Rule: "of " becomes x)

= $\frac{1}{10} \times \frac{30}{1}$ (Multiply numerators, then denominators)

= $\frac{30}{10}(\div \frac{10}{10})$ (Reduce answer to simplest form)

= $\frac{3}{1}$ = 3

Method 2:

$\frac{1}{10}$ of 30 (÷by 10; x1)

= 3

Exercise 14

a) $\frac{3}{4}$ of 200

b) $\frac{7}{10}$ of 150

c) $\frac{5}{8}$ of 800

d) $\frac{4}{5}$ of 375

GIVING PARTS OF QUANTITIES AS FRACTIONS

First change the amounts to the same unit of measurement.

Write both amounts as fractions.

Reduce the fraction to its simplest form.

Example: What fraction is 20c of R2?

R2 = 200c (Same unit of measurement)

= $\frac{20}{200} \div \frac{20}{10}$ (Both amounts as fractions)

= $\frac{1}{10}$ (Simplest form)

Exercise 15

1. Solve the problems given below, in your books, and remember to show your workings:

a) What is $\frac{3}{4}$ of 640?

b) What is $\frac{2}{3}$ of 900?

c) What fraction is $\frac{5}{8}$ of 800?

d) What is $\frac{5}{6}$ of 300?

e) What fraction is 14 hours of 1 week?

Exercise 16

1. Complete by filling in >, < or =. Show your working out:

a) $\frac{9}{10} \square \frac{19}{20}$

b) $\frac{8}{9} \square \frac{9}{10}$

c) $\frac{18}{40} \square \frac{50}{60}$

d) $\frac{8}{12} \square \frac{12}{18}$

e) $\frac{5}{7} \square \frac{7}{8}$

f) $\frac{17}{34} \square \frac{51}{2}$

2. Arrange these fractions in descending order, show your working out:

a) $\frac{5}{12}$ $\frac{3}{4}$ $\frac{1}{3}$ $\frac{5}{6}$ $\frac{7}{9}$

b) $\frac{1}{4}$ $\frac{1}{2}$ $\frac{11}{24}$ $\frac{5}{6}$ $\frac{8}{12}$

3. Arrange these fractions in ascending order, show your working out:

a) $\frac{2}{3}$ $\frac{6}{7}$ $\frac{1}{2}$ $\frac{15}{21}$ $\frac{8}{14}$

b) $\frac{3}{4}$ $\frac{2}{3}$ $\frac{5}{6}$ $\frac{8}{9}$ $\frac{11}{12}$

ADDITION AND SUBTRACTION OF COMMON FRACTIONS

If the denominators are different, you must make them the same by finding the lowest common denominator.

Remember that when changing to the LCD, what you do to the bottom must be done to the top!

Also remember that you must always write your answer in the simplest form.

Exercise 17

1. $1\frac{7}{8}+4\frac{2}{5}$
2. $11\frac{3}{7}-7\frac{3}{4}$
3. $2\frac{1}{2}+1\frac{1}{9}$
4. $8\frac{3}{18}+1\frac{7}{36}+4\frac{1}{2}$
5. $3\frac{4}{5}+7\frac{3}{10}-1\frac{1}{2}$
6. $6\frac{2}{9}-1\frac{1}{3}$
7. $10\frac{2}{3}+5\frac{1}{2}-4\frac{1}{4}$
8. $4\frac{3}{5}-2\frac{3}{4}+10\frac{2}{3}$
9. $2\frac{5}{6}+1\frac{2}{3}-2\frac{4}{8}-1\frac{1}{6}$

MULTIPLICATION OF FRACTIONS

If you are asked to multiply mixed numbers, first change these to improper fractions. Continue with the same method as before, ensuring that the answer is simplified.

Example:

$$\frac{3}{5}\times\frac{4}{1}$$

$$=\frac{28}{5}\times\frac{17}{4}$$

$$=\frac{119}{20}$$

$$=23\frac{4}{5}$$

Exercise 18

Complete the following:

1. $1\ \frac{3}{10} \times 2\ \frac{1}{2}$
2. $3\ \frac{4}{5} \times 2\ \frac{5}{10}$
3. $\frac{2}{9} \times 15\ \frac{12}{15}$
4. $3\frac{3}{8} \times 6\frac{1}{2} \times 2\frac{2}{3}$

Exercise 19

Mixed Exercise:

1. $1\frac{3}{5} + 2\frac{1}{3} + 3\frac{4}{15}$
2. $10\frac{4}{7} - 3\frac{1}{3}$
3. $4\frac{5}{6} \times 3\frac{9}{10}$
4. $2\frac{3}{4} + 3\frac{7}{8} - 1\frac{3}{5} \times 2\frac{5}{6}$
5. $5\frac{3}{7} \times 3\frac{1}{3} - 2\frac{1}{2}$
6. $6\frac{2}{4} + \frac{2}{8}\ \text{of}\ 3 + 2\frac{3}{6}$

Exercise 20

1. A baker uses $1\frac{4}{5}$ of a 10kg bag of flour each day.

How much flour does he use?

a) In a day

b) In a week

2. A recipe for biscuits makes 24 biscuits. A baker needs to make $3\frac{3}{4}$ of that amount. How many biscuits will he make?

3. Kimera is given R240. Her mother tells her to spend $\frac{3}{8}$ on flour, $\frac{1}{5}$ on sugar and to bring home the change.

a) What fraction of the money will she bring home?

b) How much money will this be?

4. Oliver's petrol tank is $\frac{4}{5}$ full. His car will use $\frac{12}{15}$ of this amount to complete its next journey. What fraction of petrol will be used?

5. A shop keeper grants a discount of $\frac{2}{3}$ off a damaged product so that he can clear a space for his new stock. The original sale price is R330. How much will the customer pay for the damaged product?

6. Siya is given R450 for his birthday. He uses $\frac{1}{5}$ to buy shoes, $\frac{1}{15}$ on CDs, $\frac{1}{6}$ for games and $\frac{1}{2}$ on clothes.

a) What fraction of the money has been spent?

b) How much change will he receive?

7. There are 185 learners in a Grade Seven group. $\frac{3}{5}$ of these learners are girls. How many boys are there?

DECIMAL FRACTIONS

What is a decimal fraction?

- A decimal fraction is a number that is written with a comma.
- Decimals are commonly used to indicate temperature, length, mass, money, and other forms of measurement.
- Proper (common) fractions can be expressed in a decimal form

  e.g. 4,9 = $4\frac{9}{10}$

➢ If we have 9 units and we add 1 more, we now have a Ten.

➢ Each place value on the left is 10 times bigger than the one on the right, e.g.

1 x 10	=	10	(T)
10 x 10	=	100	(H)
10 x 100	=	1 000	(TH)
10 x 1 000	=	10 000	(TTH)
10 x 10 000	=	100 000	(HTH)
10 x 100 000	=	1 000 000	(M)

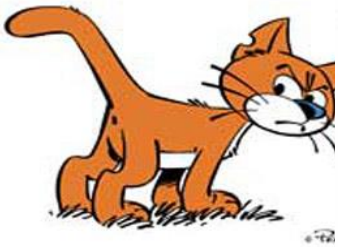
SO:

10 x 0,1	=	1	(U)
10 x 0,01	=	0,1	(t)
10 x 0,001	=	0,01	(h)
10 x 0,0001	=	0,001	(th)

DECIMALS AND PLACE VALUE

The place value table can be represented as follows:

Place value is very important when working with decimals!



Decimal Place Value Chart									
Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones	tenths	hundredths	thousandths
M	HTh	TTh	Th	H	T	O	t	h	th

Exercise 21

Use the place value table (if you need to) to complete the following:

1. Give the place value of the underlined digits:

a) 76 321, 9<u>4</u>

b) 1 036 942, 37<u>5</u>

c) 96<u>5</u> 324, 217

d) 7<u>4</u> 856 984, 253

e) 362, 1<u>2</u>5

2. Fill in >, < or =:

a) 45 h_____ 0,045

b) 7,23 _____7,321

c) 98,24 _____98,204

d) 712 th_____ 7,12

e) 146,38 _____146,380

DECIMAL FRACTIONS AND ROUNDING OFF

Remember:

1st decimal place	**=**	**tenths**
2nd decimal place	**=**	**hundredths**
3rd decimal place	**=**	**thousandths**
WHOLE NUMBER	**=**	**UNIT**

The first digit to the right of decimal point is in the tenths place. The second digit to the right of decimal point is in the hundredths place. The third digit to the right of decimal point is in the thousandths place.

When rounding off a decimal, the rules for rounding off stay the same, i.e.

- If the number to the right of the number being rounded off is between 0 and 4, the number being rounded remains the same.
- If the number to the right of the one being rounded off is between 5 and 9, the number being rounded off moves up by 1.
- To read this number correctly we would say: Ninety- four comma three seven six.
- That means we have 9 tens, 4 units, 3 tenths, 7 hundredths and 6 thousandths.

T	U	,	t	h	th
9	4	,	3	7	6

tenths t hundredths h thousandths th

Exercise 22

1. Round off to the nearest whole number:

a) 0,751

b) 1298,3

c) 0,6

d) 48,386

e) 9 999 999,999

2. Round off to the second decimal place:

a) 796 125,324 d) 908,001

b) 18,967 e) 0,008

c) 0,425

COMPARING AND ORDERING DECIMALS

When you compare decimal fractions, it is much easier to do so if the number of digits to the right of the decimal comma is the same in both decimal fractions.

We can always add 0's to the right of the decimal fraction without changing its value.
For example, the number 2,367 = 2,36700

Examples:
Arrange the following decimal fractions in ascending order:

3,31; 3,301; 0,301; 3,4; 33,013; 3,41

Answer:
We first need to make sure that all the decimal numbers have the same number of digits to the right of the decimal number. We do this by adding zeros.
3,310; 3,301; 0,301; 3,400; 33,013; 3,410

We then look at the whole numbers and arrange these in ascending order, not worrying about the fractional part yet.

0,301; 2,210; 3,301; 3,400; 3,410; 33,013

Then we arrange the numbers with equal whole number parts in ascending order by looking at the fractional part of the decimal fractions and comparing them.

0,301; 3,301; 3,310; 3,400; 3,410; 33,013

Exercise 23

1. Arrange each of the decimal sequences below in descending order:

a) 74,302 74,23 74,203 74,3 74,32

b) 115,7 115,099 115,709 115,9 115,79

2. Arrange each of the decimal sequences in ascending order:

a) 43,18 43,089 43,0 43,097 43,819

b) 734,9 734,099 734,090 743,99 734,909

3. Fill in the next 3 numbers to complete each sequence:

a) 0,3 0,6 0,9

b) 11,6 11,4 11,2

c) 3,25 3,5 3,75

d) 0,85 0,9 0,95

e) 6,5 6,25 6,0

CONVERTING TO COMMON FRACTIONS AND PERCENTAGES DENOMINATORS OF 10, 100 OR 1000

- When studying common fractions, you discovered that the denominator must be 10, 100 or 1000 before it can be converted to a decimal fraction.

  e.g. $13\frac{1}{2} = 13\frac{1}{2} \times \frac{5}{5} = 13\frac{5}{10} = 13{,}5$
- When converting from a decimal to a common fraction, first give the fraction a denominator of 10, 100 or 1000 and then simplify the fraction,

  e.g. $28{,}35 = 28\frac{35}{100} \div \frac{5}{5} = 28\frac{7}{20}$
- Remember: **Always give the simplest form!**

Exercise 24

1. Convert the decimals below to common fractions in their simplest from:

a) 25,4

b) 0,975

c) 101,58

d) 12,09

e) 1,125

f) 84,499

2. Convert the following fractions to decimals:

a) $645\frac{12}{25}$

b) $6\frac{14}{20}$

c) $12\frac{1}{8}$

d) $1699\frac{2}{50}$

e) $\frac{9}{8}$

f) $\frac{3}{5}$

CONVERTING TO PERCENTAGES

- A percentage is always out of 100
- Percentages are closely linked to common and decimal fractions

- If you can, simply change the denominator to 100. What you do to the bottom, also do to the top.

E.g. $\frac{17}{50}$ = *

$\frac{17}{50} \times \frac{2}{2} = \frac{34}{100}$

= 34%

= 0,34

$3\frac{1}{25}$ = *

$= \frac{76}{25} \times \frac{4}{4} = \frac{304}{100}$

= 304%

= 3,04

- If the denominator cannot be changed to 100, simply multiply by $\frac{100}{1}$

E.g. $\frac{19}{30}$= *

$=\frac{19}{30} \times \frac{100}{1}$

$= \frac{190}{3}$

= 63,3

$\therefore \frac{19}{30} = \frac{63,3}{100} = 63,3\%$

= 0,63

Exercise 25

1. Convert to percentages and decimals and show your working out:

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

b) $\frac{3}{5}$

c) $\frac{8}{25}$

d) $1\frac{7}{20}$

e) $18\frac{4}{5}$

2. Convert the percentages to decimals and then to common fractions in their simplest form:

a) 80%

b) 68%

c) 91%

d) 8%

e) 102%

ADDITION AND SUBTRACTION OF DECIMALS

When adding or subtracting decimals, remember the following:

- All the decimal commas must be in line with one another
- Use zero as a place holder if some numbers have more decimal places or values than others

Example 1:

142,7 + 6,395 + 12,42

142,700
6,395
+12,420
161,515

Example 2:

15,8 – 2,345

15,800
- 2,345
13,455

Exercise 26

1. Complete the following:

a) 27,046 + 1436,2
b) 0,789 + 65,7
c) 41,2 + 2,704 + 715,437
d) 99.875 + 2,1 + 112
e) 0,006 + 1043,9 + 712,38
f) 8,8 – 3,796
g) 15,81 – 7,9
h) 951,283 – 12,9
i) 53,6 – 17,154
j) 71,947 – 3,26

MULTIPLICATION OF DECIMALS- HORIZONTAL MULTIPLICATION

This is a mental process that can be carried out without showing the method.

This should be used for basic probems only.

Example:

6 x 0,02 → Ask what 6 x 2 is. Write the answer of 12, then count
= 12 how many spaces there are after the comma.
= 0,12 Insert the comma in the answer

Other examples:

0,7 x 0,3 = 0,21 1,5 x 0,3 = 0,45
0,08 x 0,2 = 0,016 0,004 x 0,003 = 0,000012

Can you see how we arrived at these answers?
Discuss this is class.

VERTICAL MULTIPLICATION

- Follow the same method you would use to multiply whole numbers.
- Ignore the decimal comma in your method.
- Once you have worked out the answer, check how many decimal places were after each number. Count the spaces, in the answer (from the right) and insert the comma.
- **You need not line up the commas underneath each other.**

Example 1:

483,2 x 7

483,2 (1 place after the comma)
x 7
3382,4 (1 place after the comma)

Example 2:

13,5 x 2,4

13,5 (1 place after the comma
x2,4 comma + 1 place comma)
540 (leave out the comma)
+2700
32,40 insert comma after 2 numbers.

MULTIPLYING BY 10, 100 AND 1000

Study the examples below:

0,6 x 10 = 6

0,145 x 100 = 14,5

0,23 x 1000 = 230

0,002 x 10^4 = 20

You should see that when you multiply by 10, 100 or 1000 to make the number bigger, the number of times the comma "moves" is in direct relation to the number of zeroes there are in the number you are multiplying by:

i.e.	x 10	moves one space to the right
	x 100	moves two spaces to the right
	x 1000	moves three spaces to the right

Exercise 27

1. **Complete the following:**

a) 0,4 x 0,09

b) 4,3 x 0,007
c) 6,2 x 0,05
d) 32,6 x 0,8
e) 8,7 x 2,4

2. Complete the following:

a) 23,7 x 2,5
b) 6,7 x 8,6
c) 432,54 x 1,7
d) 56,72 x 6,4
e) 589,6 x 0,8

3. Write down the answers to the following:

a) 14,06 x 1000
b) 0,007 x 10
c) 125,3 x 100
d) $(0,2)^2$
e) $4,59 \times 10^3$

4. Complete the following:

a) 71,83 x 6000
b) 0,007 x 10
c) 412,6 x 90
d) 9,836 x 4000
e) 98,6 x 500

5. Select the best and easiest method to solve each of the following:

a) A tour to certain parts of South Africa costs R4698,35 per person. If 68 tourists go on the trip, how much money will be collected?
b) A local deli sells cheese for R29,99 per kilogram. What will it cost me if I buy 3½ kg of cheese?
c) Liane earns R54,75 for every 1 hour shift she works. If she works 8 hours a day over 100 days, what will her total earnings be?
d) A greengrocer sells peaches for R3,99 per kilogram. A customer selects some peaches and is told that her fruit weighs 5,2 kg. How much money must she pay the greengrocer?
e) A money-lending business charges R68,75 interest per day on a loan that it made to a client. How much interest does the client have to pay for the month of April?

DIVISION OF DECIMALS. HORIZONTAL (SHORT) DIVISION

This mental process can be carried out without showing the method. **This should be used for basic problems only.**

Example:

85,635 ÷ 9 = 9,515

Dividing by 10, 100 OR 1000

Study the examples below:

21,795 ÷ 10 = 2,1795 469,837 ÷ 1000 = 0,469837

3,46 ÷ 100 = 0,0346 78 346,27 ÷ 10^4 = 7,834627

You will notice that when dividing by 10, 100 or 1000 to make the number smaller, the number of times the comma "moves" is linked to the number of zeroes in the number you are diving by.

- ÷ 10 : comma moves 1 space to the left
- ÷ 100 : comma moves 2 spaces to the left
- ÷ 1000 : comma moves 3 spaces to the left

Dividing by multiples of 10, 100 OR 1000

When you multiplied by numbers of 10, 100 or 1000, you did the following:

71,246 x 30

= 71,246 x 10 x 3

= 712,46 x 3

= 2137,38

When you divide by multiples of 10, 100 or 1000, you follow the same procedure. However, this time you need to replace the X signs with ÷ signs because you are doing a division sum.

Example:

493,64 ÷ 700

= 496,64 ÷ 100 ÷ 7

= 4,9664 ÷ 7

= 0,705

Exercise 28

1. Complete the following:

a) 71,435 ÷ 7

b) 6,257 ÷ 5

c) 837,84 ÷ 6

d) 24,1 ÷ 4

e) 288,144 ÷ 12

2. Write down the answers to the following:

a) 165,2÷ 1000

b) 18,976 ÷ 10

c) 0,0731 ÷ 100

d) 143 725,811 ÷ 1000

e) 0,8 ÷ 100

3. Use any method to complete the following:

a) 29,185 ÷ 50

b) 571,424 ÷ 700

c) 32,13÷ 9000

d) 146,5÷ 20

e) 8166,128 ÷ 400

FINANCIAL MATHS

Money in South Africa:

The rand, sign R: and the code (ZAR), is the currency of South Africa and is issued by the South African Reserve Bank. It gets its name from the Witwatersrand, the ridge upon which Johannesburg is built and where most of South Africa's gold deposits were found. The rand has the symbol "R" and is equal to 100 cents, symbol "c".

FINANCES – PROFIT, LOSS AND DISCOUNT

Profit is the surplus remaining after total costs are deducted from total revenue. Revenue means your income.

Profit can be calculated in different ways. Normally when we talk about a 10% profit, we calculate it on the cost price. We sometimes also refer to a 10% mark-up.
Example: If I sell a football which cost me R200,00 for R220,00, I made a 10% profit.

Loss is the excess of expenditure over income.

Discount is the amount deducted from the asking price before payment.

Remember that profit and loss do not only apply to businesses but also to your personal income.

Exercise 29

Are you making a profit or a loss in these examples. How much profit or loss?

1a) You are buying sweets for 45c and selling them for 65c each. I made a profit / loss of _____(amount) per sweet.

b) You are buying pencils for R2,00 each and selling them for R2,40 each to your friends. You manage to sell 40 pencils. I made a profit / loss of _____(amount).

c) On Saturdays you hire a stall at the local flea-market for R50,00. You are buying juice for R1.50 each and selling them for R2,50 each. Last Saturday it was cold, and you only managed to sell 40. I made a profit / loss of _____ (amount).

d) You are buying biscuits in large packets of 100 for R10,45 per packet. You are selling to your friends for 30c per biscuit. During the first break, you manage to sell 75 biscuits. I made a profit/ loss of _____(amount).

e) You are buying fruit directly from the market and selling it to your neighbours, friends, and family. Last weekend you bought 3 boxes of bananas. Each box contained 12 bunches of 12 bananas each. Each box cost you R75,00. You managed to sell 80% of

the bananas at 65c each before the rest were too ripe and you had to throw them away. I made a profit/ loss of _____(amount).

2a) You are buying sweets for 45 c each and you want to make a 25% profit. How much must you sell them for? _____(amount).
b) You are buying pens for R1,27 each and you want to make a 17% profit. How much must you sell them for? _____(amount).
c) On Sundays you hire a stall at the local flea-market for R50,00. You buy juice for R1,50 per box and you normally sell 200 units per Sunday. If you want to make a 35% profit after paying for the stall, how much must you ask per fruit juice? _____(amount).

FINANCES - BUDGET

Do you know what a budget is? Can I have my own budget or is it only for adults?

Budget is the estimate of cost and revenues over a specific period.
Budget is like a scale where you try to balance your income and your expenses. Important: Your income should always outweigh your expenses.

Creating a budget is the most important step in controlling your money. The first rule of budgeting is: Spend less than you earn!

Example: If you received a R250,00 allowance (pocket money) per month and another R80 for your birthday, you cannot spend more than R330,00 for the entire month.

Net income is, like profit, the surplus remaining after all costs are deducted from total (gross) revenue. If the expenses exceed the income, we call it a **shortage.**

It is always a bright idea to SAVE for a RAINY day!

FINANCES- LOANS AND INTEREST

What is a loan? What is interest?

A loan is a sum of money that an individual or a company lends to an individual or a company with the objective of gaining profits from interest when the money is paid back.

Interest is the fee charged by a lender to a borrower for the use of borrowed money, usually expressed as an annual percentage of the amount borrowed, also called interest rate.

There are two kinds of interest: **Simple and compound.** Simple or flat rate interest is usually paid each year as a fixed percentage of the amount borrowed or lent at the start. With compound interest, you also pay interest on the interest!

The simple interest formula is as follows:

Interest = Principal x Rate x Time

Where:

Interest is the total amount of interest paid.

Principal is the mount lent or borrowed.

Rate is the percentage of the principal charged as interest each year.

Time is the time in years to pay back the loan.

It is never a good idea to BORROW money. Rather SAVE until you can afford to buy something!

END OF TERM 1 AND WE MADE IT!