

**CRITICALLY ANALYSE HOW MATHEMATICS IS USED IN SOCIAL, POLITICAL AND ECONOMIC RELATIONS**

**US No: 7449 Credits 2**

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| Learner’s name |  |
| Facilitator’s name |  |
| Starting date |  |

##### Hi there!

##### Welcome to a learning experience that will give you all you need to know about numeracy.

##### Your facilitator will demonstrate and explain how to do certain things and then you will practice them. We hope you will enjoy this!

We have included some new words to learn so that you can improve your vocabulary. If you are not sure about the meaning of a word or how to say it, ask your facilitator.

We hope that when you have learnt these skills you will share them with others and take them from the workplace into your life

Have fun!



**Is Math Important?**

Knowing math is more than being able to balance your chequebook. Math skills are needed to shop wisely, buy the best insurance, build your house, , buy furniture, and follow a recipe and, especially critical today, in the world of work. How would one be able to make sure you earned the correct salary, you measured correctly or that an items cost you the correct price without math? Let’s take a bit of time to examine this in more detail:

*Attitudes and Misconceptions*

Do your experiences in mathematics cause you anxiety? Have you been left with the impression that mathematics is difficult and only some people are 'good' at mathematics? Are you one of those people who believe that you 'can't do math', that you're missing that 'math gene'? Do you have the dreaded disease called Math Anxiety? Read on, sometimes our school experiences leave us with the wrong impression about mathematics. There are many misconceptions that lead one to believe that only some individuals can do mathematics.

*When Does the Most Powerful Learning Usually Occur?*

* When one makes a mistake!
* If you take the time to analyse where you go wrong, you can't help but learn. Never feel badly about making mistakes in mathematics!
* Mathematics has never been more important, technology demands that we work smarter and have stronger problem solving skills!

**Module 1**

**MATHEMATICAL LANGUAGE AND RELATIONSHIPS IN THE WORKPLACE**

This Module is aligned to Specific Outcome 1:

Critically analyse the use of mathematical language and relationships in the workplace

This Module comprises the theoretical component of your learning and includes activities that are class-based, formative and of a summative nature.

After completing this Module, you should be able to:

* Describe the ways in which mathematics is used in the workplace
* Describe ways in which mathematical relationships and language are used to represent specific contexts

**BS00559_ TASK 1 – This task needs to be completed and placed in your Portfolio of Evidence. This activity must be completed as Group Work.**

In groups – brainstorm as many activities as you can possibly come up with that might use math in the workplace. Write key words and concepts below.

This Task is aligned to Specific Outcome 1

**How is Mathematics used in the Workplace?**

Once we know how mathematics is used in the calculation of salaries and wages, we can more easily negotiate our salary or wage to ensure that we have the correct amount of money to pay our bills every week or month! Let’s take a detailed look at some of the types of mathematical calculations. Salaries and wages are paid to staff or personnel employed in any business and organisation for the services they render to the business or organisation. In some businesses or organisations, this may be one of the biggest expenses that a business incurs to make a profit or to render services or to sell goods. When employing a person, you will normally need a contract or an agreement defining the duties, remuneration, benefits, etc. with each of the employees. Should you pay or calculate any amount not defined in such agreement, you may overpay the employee. On the other hand, if you do not pay any amounts defined in such contract or agreement, you may underpay the employee, who could possibly result in a dispute, or an unhappy employee.

*Salaries*

Salaries are usually paid on a monthly basis at a **fixed rate** for the month. There is usually no direct relationship between the hours worked or the number of units produced, as is the case with wages.

*Salary = Fixed Hourly rate x 22 days x 9 hours*

*R1980 = R10 x 22 x 9*

*Wages*

Wages are normally paid on a weekly, fortnightly and in some cases on a daily basis. Wages normally has a direct relationship with the amount of hours worked or the number of units produced in the case of piecework. In some cases, wages can be charged to the trading account, where it is a component of the cost of the goods sold. However, when it is not directly related to the cost of goods sold, it may be charged to the profit and loss account as normal business expenses.

*Wage = Fixed hourly rate x 7 days x 9 hours*

*R630 = R10 x 7 x 9*

*Gross Pay*

In the case of wages**, gross pay** is the total of the **basic hourly rate multiplied by the number of hours worked**, plus any other remuneration such as overtime, allowances, etc. paid to an employee or worker before any deductions is taken into consideration. In the case of salaries, gross pay is the total of the basic monthly salary plus any allowances, such as commissions, travel allowances, etc. before any deductions is taken into consideration.

*Gross pay = (Fixed hourly rate x 7 days x 9 hours) + (number of hours overtime x 1.5 x fixed hourly rate)*

*R705 = (R10 x 7 x 9) + (5 x 1.5. x R10)*

*Deductions*

Deductions are any amounts that you must deduct (in accordance with any legislation or any agreement) from an employee or worker’s salary or wages. The following are some examples of deductions:

* Unemployment Insurance Fund is currently calculated at a rate of 1 percent of the gross earnings.

*UIF Deduction = gross pay x 1%*

*UIF Deduction = R630 x 1/100 = R6.30*

Employee’s Tax must be calculated and deducted from the employee’s salary or wages in accordance with the Income Tax Act, as amended from time to time. However, if an employee or worker earns less than a certain threshold, which is determined from time to time, no income tax is to be deducted from that employee or worker’s salary or wage. The tax is calculated from the income tax tables or IRP 10 tables on the taxable income.

* Pension scheme or provident fund of which the employee is a member.
* Medical aid or medical scheme of which the employee is a member.
* Insurance - Life and/or short term insurance for which an employee has a valid debit order to deduct the premiums from his or her salary or wage.
* Trade Union or any other agreed deductions.
* Garnishee orders issued by a court of law (in order to recover bad debts or maintenance from an employee’s salary or wages).

Deductions are actually money that is deducted on behalf of an employee. It is normally paid over to the relevant institution or statutory body.

*Net Pay*

This is the amount that an employee will take home after any deductions are made from his gross pay. The net pay is usually paid in cash or cheque to the employee or worker or by bank transfer directly from your bank account into the employee’s bank account.

*Net pay = Gross pay – UIF – Medical Aid*

*R560.70 = R630 – R6.30 – R63*

*Employer’s Contributions*

Employer’s contributions are the amount that the employer must contribute towards certain deductions deducted from an employee’s salary or wages. In some cases levies must also be paid to the relevant authorities, calculated on the payroll. The employer must pay the employer’s contributions to the relevant institution or organisation together with the amount deducted from an employee’s salary or wage (if applicable).

The following is a few examples of employer’s contributions:

* Unemployment Insurance Fund calculated at a rate of 1 percent of the gross earnings.
* Pension or provident fund.
* Medical aid or Medical scheme.
* Skills Development Levy (SDL) – 1 percent of the payroll must also be paid to the South African Revenue Services. In the case of the Skills Development Levy, no amount is deducted from an employee’s salary or wages.

**Salary Increases**

When we receive an increase in salary or wage the increase will normally be expressed as a percentage. Our boss or union representative might say: You will receive a 5% increase in wages from the 1st of July 2006. But how will you know how much that is?

*New Gross pay = old gross pay + (old gross pay x 5%)*

*R661.50 = R630 + (R630 X5/100)*

Sometimes you might hear that the union has negotiated an “across the board” increase of R 50.00. That means that everyone will then receive R50 more than they did previously. There is then a difference in how much the percentage increase would be per person, because every worker might have a different rate of gross pay to start off with.

***Worker A:***

*New gross pay = old gross pay + R50*

*R680 = R630 + R50*

***Worker B:***

*New gross pay = old gross pay + R50*

*RR650 = R600 + R50*

**Productivity Ratios**

In order to make sure that an agribusiness is profitable and that all the workers are working at the best possible speed to produce a high quality crop that can be sold for a high price at a profit, we need to measure “productivity” of our workers. But what is productivity and how can we use mathematics to work out that each worker is measured in the same way?

***Productivity –*** *a measurement of output per hours worked*

***Worker A:***

*John manages to prune 50 trees per 9 hour day*

*Productivity ratio = 50/9*

*Productivity ratio = 5.555 trees per hour*

***Worker B:***

*Sipho manages to prune 60 trees per 9 hour day*

*Productivity ratio = 60/9*

*Productivity ratio = 6.666 trees per hour*

*Can you see that Sipho has a better productivity ratio than John?*

Mathematical relationships and language that represent a particular perspective Mathematics in the workplace has a language on its own. It is important that we understand the words and their meanings before we can understand the mathematical steps to solve problems. We are going to review a list of mathematical words, some that you may already know and some that may be new to you. Have fun and remember what you learn!

**Different Forms of Comparisons**

***Compare:*** *to look at two or more things together and consider them*

*Susie worked fast compared to Alfred because she weeded 15 more rows than he did.*

**BS00559_ TASK 2 – This task needs to be completed and placed in your Portfolio of Evidence.**

You are working on a strawberry farm. There are 10 people in the team. The team has been given the task of planting strawberry seedlings for the day. The team leader has explained that if all 5000 plants are planted within 1 day, then the team will receive a bonus of R500 for the week. But all the team members do not work at the same rate (they are not equally productive).

1. How will you measure each person’s productivity ratio to make sure that the bonus is divided fairly between all the team members, according to their productivity ratio?

This Task is aligned to Specific Outcome 1

**Differences**

The difference is what is found when one number is subtracted from another. Finding the difference in a number requires the use of subtraction.

***Worker A:***

*John manages to prune 50 trees per 9 hour day*

*Productivity ratio = 50/9*

*Productivity ratio = 5.555 trees per hour*

***Worker B:***

*Sipho manages to prune 60 trees per 9 hour day*

*Productivity ratio = 60/9*

*Productivity ratio = 6.666 trees per hour*

*Can you see that Sipho has a better productivity ratio than John?*

*The comparison in productivity rate is:*

*Worker A: 5.555 then Worker B 6.666*

*The difference in productivity rate is:*

*Worker A has a 1.111 lower productivity ratio than worker B.*

**Versus**

Means "against" or "opposed to".

*Worker A has a 6.66 productivity ration versus Worker B’s ratio of 5.55*

*Worker A earns R630 per week versus Worker B who earns R650*

**Manipulation of Graphs through Choice of Graph, Scale of Axes and Nature of Axes**

In some of the other modules we have learnt about drawing graphs, and what types of information we might express on a graph. Let’s take a brief look at how we can express data differently through applying different types of graph or adjusting the scale of the graph’s axis:

*Pie Charts*

Information in reports, meetings, newspapers, magazines and leaflets may be displayed as pie charts. A pie chart is a good way of displaying data as it is easy to compare the segments.

*Note:*

* A pie chart is difficult to read if it has more than six slices.
* It may be difficult to compare slices when they are very similar in size.

*Line Graphs*

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*Note:*

* A line graph shows how the temperature varies.
* By joining the points together, you can see that the temperature doesn't just 'jump' from one degree to the next.

In the graph above the temperature difference look very small don’t they?

**Use of Different Averages: Mean, Median and Mode**

*What is an Average?*

The average value is a number that is typical for a set of figures. The average is like the middle point of the numbers. Finding the average helps you do calculations and also makes it possible to compare sets of numbers. For example you might spend between R20 and R100 a week on shopping. Finding the average amount you've spent per week will help you plan your month's spending. The average weekly spend gives you an idea of whether you're spending more or less than you plan to.



There is more than one type of average you can have. The type used most often is the mean value. When people talk about the average of something, like average price, average wage or average height, they are usually talking about the mean value. The mean value of the weekly spending shown in the graph is R46. Can you see that this is about in the middle of the five different amounts shown? The mean value can be useful for comparing things. For example you can find the goal average for a football team by finding the mean value of the goals scored per match. When you compare goal averages of two teams you are comparing mean values.

Mean values can be worked out for the weather too. If the mean winter temperature increases every year then you might think that global warming is a serious problem (see the chart below).



*How do you calculate the Mean?*

The **mean value** of a set of figures is calculated like this: add up the figures to find the total and then divide by the number of figures in the set.

**Mean value = total amount ÷ number of figures**

So to find the mean value of 5 numbers add them then divide the answer by 5. To find the mean of 20 numbers add them then divide by 20.

*What about Real Life Averages?*

This method works for 'real problems' as well as for just figures. Here's an example:

*The shoe sizes of a group of 6 students are: 5, 6, 7, 8, 9 and 12*

*How do you find the mean shoe size of the six students?*

*The total of the students’ shoe size is 5 + 6 + 7 + 8 + 9 + 12 = 48*

*There are 6 students, thus the mean show size is 48 / 6 = 8*

*(We might guess from this that most of the students are male as the majority of females have feet smaller than size 8 !)*

*Decimal Answers (Impossible Answers)*

The mean value is sometimes an 'impossible' number.

**Let’s look at a practical example:**

*A football team has a mean score of 2.4. goals in a month.*

*You can’t have 0.4 of a goal!*

*The mean family size in a town is 4.5.*

*But we can’t have 0.5 of a person!*

*Distorted Averages*

Sometimes the mean value may give a false impression of the figures. In that case the mean value is said to be **distorted**.

*The mean salary earned in a company is R42, 200. You might like the idea of working for the company! But let’s look at the figures:*

*Employee 1 earns R8, 000*

*Employee 2 earns R12, 000*

*Employee 3 earns R8, 000*

*Employee 4 earns R8, 000*

*The* ***Director*** *of the company earns R175, 000*

*Because the Director earns much more than the employees his/her salary raises the mean salary. Let’s do the sum:*

*To work out the mean first find the total of the wages:*

*8,000 + 12,000 + 8,000 + 8,000 + 175,000 = 211,000*

*Then divide by 5, the number of people:*

*211,000 / 5 = 42,200*

*The mean salary is R42, 200. But most staff earns a lot less than this. Most employees earn less than the mean salary. For this reason we say that the mean is distorted.*

The average price of a house in an area seems reasonable. But be careful, the average could be **distorted.** The mean price could be distorted if one or two houses are selling for much less than the others, perhaps because they need lots of work doing to them. It may seem like a cheap area to buy a house in, but if you look at all of the prices they may be more expensive than the mean (or 'average') price suggested! Notice that people say 'average' price of houses when usually what they are talking about is the mean price.

*Range*

Range is the difference between the highest and lowest values in a set of data.

**Let’s look at a practical example:**

*Find the range of these numbers: 6, 4, 6, 5, 3*

*Put them in order first as this makes it easier to see the lowest and highest: 3, 4, 5, 6, 6*

*The lowest number is 3 and the highest is 6*

*Find the difference. Subtract 3 from 6*

*6 – 3 = 3*

*The* ***range*** *of this set of data is 3*

*Median*

Median is the middle value of a set of data. It is the mid-point when the numbers are written out in order.

*Find the median of these numbers: 6, 4, 6, 5, 3*

*First put the numbers in order. This makes it easier to find the median: 3, 4, 5, 6, 6*

*You can now see that 5 is the middle number. It is half way along the list. The* ***median value*** *of this set of data is therefore 5.*

*Find the median value of these numbers: 9, 3, 5, 7, 10, 5*

*First put the numbers in order: 3, 5, 5, 7, 9, 10*

*You can now see that 5 and 7 are in the middle of the list. The median is the exact middle. So here we need a number half way between 5 and 7. That is 6*

*The* ***median value*** *of this set of numbers is therefore 6*

Notice that you can have a median value, which isn't in the list of data itself. In the example above, 6 is the median value, but 6 aren’t in the list of numbers given in the question. Why do we use the median? The median is not so easily distorted as the mean value. It is therefore a better type of average to use.

*Mode*

The **mode** is the name of another type of average. The mode is the most common item in a set of data. It's the number or thing that appears most often. For example in a list of peoples' favourite films the mode would be the most popular choice - the one with most votes.

*Find the mode of: 6, 4, 6, 5, 3, 7, 6*

*First put the numbers in order: 3, 4, 5, 6, 6, 6, 7*

*You can see that 6 is the most common number in the list. There are three of them. We can say that 6 is the* ***mode*** *of this set of data*

*Mean, Median and Mode Together*

**Mean** = total ÷ number of figures.

**Median** = middle value when the figures are written in order.

**Mode** = most common figure in the data.

*Comparing mean, median and mode*

Let’s look at the figures for sick days in the farm 'Acme Ltd'. The number of days taken by the employees was:

0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 2, 2, 2, 3, 3, 14.

Now let's compare those figures with the figures from another farm, 'Corn Supplies'.

The number of sick days taken by employees at Data Supplies is:

0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 2, 2, 2, 3, 3, 3, 4

For this farm there are two people with no days off sick, ten with 1 day sick, three 2's, three 3's and one 4. **So the mode is 1.**

If we compare sick days for these farms we could choose to compare using the mean, the median or the mode. Let's look at the difference between them. We need to know the **mean**, **median** and **mode** for both farms. You can work these out yourself if you want to, but to save time here they are:

**Mean Median Mode**

Acme Ltd 1.6 1 0

Corn Supplies 1.5 1 1

In both companies the **mean** is higher than the number of sick days most people have taken. The one person who took 14 days off distorts For Acme Ltd the mean. The **median** is **1** for both companies. So we'd expect the sick days to be more or less the same in both companies if we used the median values to compare them. We can also use the **mode** to compare them. Acme Ltd has a mode of **0** and Data Supplies a higher value of **1**. Going by the mode, we expect sick days to be more common in Data Supplies.

Which measure do you think is most useful for comparing the companies in this case? You could say that the mode is best as there does seem to be a higher level of sick days taken in Data Supplies - only two people there weren't sick at all!

**BS00559_ TASK 3 – This task needs to be completed and placed in your Portfolio of Evidence.**

The average (mean) is calculated by adding up the figures given and then divided by the total number of figures;

Average = total amount + total number of figures

Example: find the average of 2, 4, 6. The total amount is 2 + 4 + 6 = 12. There are 3 numbers, the average is therefore 12/3 = 4

Calculate the average of these figures:

1. 5, 12, 7
2. 6, 9, 15

This Task is aligned to Specific Outcome 1

**Module 2**

**MATHEMATICAL LANGUAGE AND RELATIONSHIPS IN THE ECONOMY**

This Module is aligned to Specific Outcome 2:

Critically analyse the use of mathematical language and relationships in the economy

This Module comprises the theoretical component of your learning and includes activities that are class-based, formative and of a summative nature.

After completing this Module, you should be able to:

* Describe the ways in which mathematics is used in the economy
* Describe ways in which mathematical relationships and language are used to represent specific contexts in the economy



**Budgeting**

Budget generally refers to a list of all planned expenses.

We budget to spend our weekly wage of R600 as follows:

R 120 for food

+ R 50 for water and electricity

+ R 130 for transport

+ R 100 for clothes

+ R 100 for payment of accounts

+ R 50 for entertainment

+ R 50 for saving

R 600 total

**Interest rates**

The cost of borrowing money, expressed as a percentage, usually over a period of one year.

• We could buy a television set for R 500.00 cash.

• But we choose to pay it off over 12 months at an interest rate of 10%.

• This means we would calculate our monthly payment as follows:

* Capital R 500 / 12 months = R41.66 per month
* Interest (R500 x 10%) / 12 months = R4.16 per month
* This means that we must pay a total instalment of R45.83 per month.
* At the end we would have paid R550.00.

**Mortgage**

A loan to purchase a home, where the property is used to guarantee repayment of the loan We take a mortgage of R 180 000.00 + interest of 10% over a 20 year period to buy a house. The interest and repayments would work in the same way as that of account payments. The difference is that the interest rate will be calculated differently – this is called compound interest. The interest rates are also not always fixed and may change accordingly to decisions made by the bank when the economy of the country changes.

**Service charges**

The price that we pay for a public service. When you establish or re-establish an electric service, water service or telephone service account for residential or general service, one of the following service charges will be applied to your first bill. When you connect to Telkom, you will normally pay services charges of R45.00 per month.

**Fuel prices**

The price that we pay for Petrol, Diesel and Oil varies a from month to month.

The largest component of the basic fuels price is the price that one would be paying on international markets when physically importing product to South Africa. The FOB (Free on ship’s board) product prices from different locations in the world, based on international product availability and product quality, are used. The petrol FOB price is calculated as 50% of the Mediterranean spot price for Premium unleaded petrol and 50% of the Singapore spot price for 95 Octane unleaded petrol. For the FOB price of Diesel, the new BFP formula use spot prices calculated as 50% of the Mediterranean price for Gas oil and 50% of the Arab Gulf price for Gas oil, plus the quoted spot price market premiums applicable.

**Pensions**

The amount of the old age grant changes every year. In 2005 it is **R780 per month**. If you cannot look after yourself and need full-time care from someone else, you may also apply for a Grant-In-Aid which you can get in addition to your old age grant. Also remember that people who get an old age pension have special housing subsidies available to them

**Inflation**

Consumer inflation is calculated as the annual percentage change of the prices of a collection of some 1 500 different goods and services bought by South African households – much more than just a shopping basket-full. This is what is called the Consumer Price Index (CPI). Other definitions of inflation are really nothing more than a form of shorthand for explaining which goods and services are either included in, or excluded from, the "basket" for different purposes.

**Value of the rand**

The value of the rand influences the quantity of goods South Africa can export and import. The dramatic fall in the value of the rand at the end of 2001 had a dramatic influence on the value of goods that South Africa exported and imported last year. This affected the trade balance of the balance of payments. This balance measures the relationship between the value of goods that a country exports and imports. If the value of goods exported is more than that of the imported goods, the balance is in surplus, i.e. more foreign money flows into the country than flows out as payment for goods produced in the rest of the world. If the value of imports is more than exports, the balance is in a deficit.

**Exchange rates**

The price of a unit of foreign currency in terms of domestic currency. Alternatively the number of units of domestic currency required purchasing one unit of foreign currency. The higher this price, the weaker is the domestic currency's exchange rate. In 2000 the price of exchange rate of the rand to the dollar was $1= R12. By early 2005 one dollar cost significantly less at around $1 = R 6.

**BS00559_ TASK 4 – This task needs to be completed and placed in your Portfolio of Evidence. This activity must be completed as Group Work.**

In groups – discuss and explain how you use mathematics to draw up your budget.

This Task is aligned to Specific Outcome 2

**Module 3**

**MATHEMATICS IN SOCIAL RELATIONS**

This Module is aligned to Specific Outcome 3:

Critically analyse the use of mathematics in social relations

This Module comprises the theoretical component of your learning and includes activities that are class-based, formative and of a summative nature.

After completing this Module, you should be able to:

* Describe the ways in which mathematics is used in social relations
* Describe the use of mathematics in the media

**BS00559_ TASK 5 – This task needs to be completed and placed in your Portfolio of Evidence. This activity must be completed as Group Work.**

In groups – discuss how political situations in the past applied mathematics to your community.

This Task is aligned to Specific Outcome 3

Ways in which mathematics can be used as a filter for social differentiation

**Statistics:**

Interpreting and constructing graphs, mean, median and mode, frequency distribution, and histograms.

**Social differentiation**

Mathematics is a human activity. All peoples of the world have contributed to the development of mathematics. Mathematics is used as an instrument to express ideas from a wide range of other fields. The use of mathematics in these fields often creates problems. This outcome aims to foster a critical outlook to enable learners to engage with issues that concern their lives individually, in their communities and beyond.

**Statistical information of all our social resources and markets**

**A few statistics about our country:**

**Population:** 44,187,637

**Note**: estimates for this country explicitly take into account the effects of excess mortality due to AIDS; this can result in lower life expectancy, higher infant mortality and death rates, lower population and growth rates, and changes in the distribution of population by age and sex than would otherwise be expected (July 2006 est.)

**Age structure:**

0-14 years: 29.7% (male 6,603,220/female 6,525,810)

15-64 years: 65% (male 13,955,950/female 14,766,843)

65 years and over: 5.3% (male 905,870/female 1,429,944) (2006 est.)

**Median age:**

Total: 24.1 years

Male: 23.3 years

Female: 25 years (2006 est.)

**Population growth rate:**

-0.4% (2006 est.)

**Birth rate:** 18.2 births/1,000 population (2006 EST.)

**Death rate:** 22 deaths/1,000 population (2006 EST.)

**Net migration rate:**

-0.16 migrant(s)/1,000 population

**Note:** there is an increasing flow of Zimbabweans into South Africa and Botswana in search of better economic opportunities (2006 EST.)

**Sex ratio:**

At birth: 1.02 male(s)/female

Under 15 years: 1.01 male(s)/female

15-64 years: 0.95 male(s)/female

65 years and over: 0.63 male(s)/female

Total population: 0.95 male(s)/female (2006 EST.)

**Infant mortality rate:**

Total: 60.66 deaths/1,000 live births

Male: 64.31 deaths/1,000 live births

Female: 56.92 deaths/1,000 live births (2006 EST.)

**Life expectancy at birth:**

Total population: 42.73 years

Male: 43.25 years

Female: 42.19 years (2006 EST.)

**Total fertility rate:**

2.2 children born/woman (2006 EST.)

**HIV/AIDS – adult prevalence rate:**

21.5% (2003 EST.)

**HIV/AIDS - people living with HIV/AIDS:**

5.3 million (2003 EST.)

**HIV/AIDS - deaths:**

370,000 (2003 EST.)

**Ethnic groups:** Black African 79%, white 9.6%, coloured 8.9%, Indian/Asian 2.5% (2001 census)

**Religions:**

Zion Christian 11.1%, Pentecostal/Charismatic 8.2%, Catholic 7.1%, Methodist 6.8%, Dutch Reformed 6.7%, Anglican 3.8%, other Christian 36%, Islam 1.5%, other 2.3%, unspecified 1.4%, none 15.1% (2001 census)

**Languages:**

IsiZulu 23.8%, IsiXhosa 17.6%, Afrikaans 13.3%, Sepedi 9.4%, English 8.2%, Setswana 8.2%, Sesotho 7.9%, Xitsonga 4.4%, other 7.2% (2001 census)

**Literacy:**

Definition: age 15 and over can read and write

Total population: 86.4%

Male: 87%

Female: 85.7% (2003 EST.)

**Historical and Possible Future Contexts**

**Apartheid policies**

Under past political regimes like Apartheid, there was political discrimination against specific racial and gender groups who were classed according to their statistical status and effectively excluded from living in specific areas, owning property and certain levels of education.

**Employment Equity**

South Africa's policy on black economic empowerment (BEE) is not simply a moral initiative to redress the wrongs of the past. It is a pragmatic growth strategy that aims to realise the country's full economic potential. In the decades before South Africa achieved democracy in 1994, the apartheid government systematically excluded African, Indian and coloured people - collectively known as "black people" - from meaningful participation in the country's economy.

This inevitably caused much poverty and suffering - and a profoundly sick economy. The distortions in the economy eventually led to a crisis, started in the 1970s, when gross domestic product growth fell to zero, and then hovered at about 3.4% in the 1980s. At a time when other developing economies with similar resources were growing, South Africa was stagnating.

**Full potential**

"Our country requires an economy that can meet the needs of all our economic citizens - our people and their enterprises - in a sustainable manner," the Department of Trade and Industry (DTI) says in its BEE strategy document. "This will only be possible if our economy builds on the full potential of all persons and communities across the length and breadth of this country." Despite the many economic gains made in the country's 12 years of democracy - growth hit 5.1% in 2005 - the racial divide between rich and poor remains. The DTI points out that such inequality can have a profound effect on political stability:

"Societies characterised by entrenched gender inequality or racially or ethnically defined wealth disparities are not likely to be socially and politically stable, particularly as economic growth can easily exacerbate these inequalities."

**Broad-based growth**

Black economic empowerment is not affirmative action, although employment equity forms part of it. Nor does it aim to merely take wealth from white people and give it to blacks. It is simply a growth strategy, targeting the South African economy's weakest point: inequality. "No economy can grow by excluding any part of its people, and an economy that is not growing cannot integrate all of its citizens in a meaningful way," the DTI says.

"As such, this strategy stresses a BEE process that is associated with growth, development and enterprise development, and not merely the redistribution of existing wealth." There is a danger, recognised by the government, that BEE will simply replace the old elite with a new black one, leaving fundamental inequalities intact. For this reason the strategy is broad-based, as shown in the name of the legislation enacted in 2004: the Broad Based Black Economic Empowerment Act. "Government’s approach [is] to situate black economic empowerment within the context of a broader national empowerment strategy … focused on historically disadvantaged people, and particularly black people, women, youth, the disabled, and rural communities," the DTI says. "Discrimination is at its most severe when race coincides with gender and/or disability."

**How to achieve Black Economic Empowerment (BEE)**

Black economic empowerment is driven by legislation and regulation. An integral part of the BEE Act of 2004 is the balanced scorecard, which measures companies' empowerment progress in four areas:

* Direct empowerment through ownership and control of enterprises and assets. Management at senior level.
* Human resource development and employment equity.
* Indirect empowerment through:
* Preferential procurement,
* Enterprise development, and
* Corporate social investment - a residual and open-ended category.

This scorecard is defined and elaborated in the recently released BEE codes of good practice, which will soon be passed into law. The codes will be binding on all state bodies and public companies, and the government will be required to apply them when making economic decisions on:

􀁸 Procurement,

􀁸 Licensing and concessions,

􀁸 Public-private partnerships, and

􀁸 The sale of state-owned assets or businesses.

Private companies must apply the codes if they want to do business with any government enterprise or organ of state - that is, to tender for business, apply for licences and concessions, enter into public-private partnerships, or buy state-owned assets. Companies are also encouraged to apply the codes in their interactions with one another, since preferential procurement will affect most private companies throughout the supply chain. Different industries have also been encouraged to draw up their own charters on BEE, so that all sectors can adopt a uniform approach to empowerment and how it is measured. The DTI has all the relevant documents and information on black economic empowerment (in English) available on request.

**The Use of Mathematics in the Media**

In this age of rapid information expansion and technology, the ability to manage data and information is an indispensable skill for every citizen. There is an ever increasing need to understand how information is processed and translated into useable knowledge. Learners should acquire these skills for critical encounter with information and to make informed decisions.

Mathematics is a language that uses notations, symbols, terminology, conventions, models and expressions to process and communicate information. Every day, we are bombarded by numbers. The source of information using numbers is frequently on the news. Daily newspapers, magazines, TV and radio news, report stories which include numbers. Often, these numbers go by so fast, we don't have time to stop and process them.

**BS00559_ TASK 6 – This task needs to be completed and placed in your Portfolio of Evidence. This activity must be completed as Group Work.**

In groups – discuss how the application of BEE ratios might be of benefit to your community

This Task is aligned to Specific Outcome 3

**Module 4**

**MATHEMATICAL LANGUAGE AND RELATIONSHIPS IN POLITICAL RELATIONS**

This Module is aligned to Specific Outcome 4:

Critically analyse use of mathematics and mathematical language and relationships in political relations

This Module comprises the theoretical component of your learning and includes activities that are class-based, formative and of a summative nature.

After completing this Module, you should be able to:

* Describe the ways in which mathematics is used in political relations

We define statistics as the study of a large population on the basis of a small data sample. We make inferences about the population based on the sample data. What is data? We are mainly interested in numerical data. For us, data are numbers that describe a numerical characteristic of a certain number of members of the population. We may talk about data on height, weight, number of typos, and so on. In this course we talk about data in the context of statistics.

How mathematics is used in – Income distribution

**Income Distribution:**

A description of the fractions of a population that are at various levels of income. The larger the differences in income, the "worse" the income distribution is usually said to be, the smaller the "better."

**Language plays an important role in how we understand mathematics here:**

**The following are examples of a population:**

If we are studying the income distribution of South Africans, then the population is the whole South African population. If we are studying the income distribution of the immigrant American population, then the population is the whole immigrant American population.

**How Mathematics is used in Census**

A census is the process of obtaining information about every member of a population (not necessarily a human population). It can be contrasted with sampling in which information is only obtained from a subset of a population. As such it is a method used for accumulating statistical data, and it is also vital to democracy (voting).