MATHEMATICAL FUNCTIONS: ILLUSTRATING SPIRITUAL CONCEPTS

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INTRODUCTION

Spiritual truth is well understood when concrete illustrations are made to illustrate it. It is therefore important that, as Christians who are expected to obey the command to "Go therefore and make disciples of all nations ...." (Matt. 28:19, 20) we illustrate biblical teachings with the concepts and principles of our disciplines.

Ellen White writes; "In Christ's parable-teaching the same principle is seen as his own mission to the world. That we might become acquainted with His divine character and life, Christ took our nature, and dwelt among us. Divinity was revealed in humanity; the invisible glory in the visible human form. Men could learn of the unknown through the known; heavenly things were revealed through the earthly, God was made manifest in the likeness of men. So it was in Christ's teaching: the unknown was illustrated by the known; divine truths by earthly things with which the people were most familiar''.

Christians must therefore follow the example of their master. Through experiments, observations, research, experience and so on, several truths have been established in several disciplines. These truths must be seen as the truths of nature which are the handy works of God. Thus the truths of nature and life-experience must be connected with the truths of scripture.

The Psalmist in appreciating nature remarked that "the heavens declare the glory of God and the firmament shows his handiworks" (Psalm 19:1). The example of the Psalmist must be followed so that in our pursuit for truth in nature and life-experience the voice of God will be heard. The expression of any truth without the voice of God is therefore a vain imagination. An established truth must associate man with God, and earth with Heaven. Thus truths wherever they are found are linked together and must not contradict one another.

My purpose is therefore to use mathematical relations and functions to illustrate biblical truths God has revealed to us. When biblical truth is shared in any academic discipline it deepens ones understanding and appreciation of such truth.

The focus of true religion is the perfect human relationship with his maker (God). This is seen in God's revealed purpose of creating man in his written word. The book of Genesis states, "and God said, let us make man in our image after our likeness...." (Gen 1:26). This statement from God brings up a relationship between him and man which has mathematical implications. I have therefore been motivated by my several years of teaching mathematics to look at 'man in the image after the likeness of God under the mathematical concept of functions.
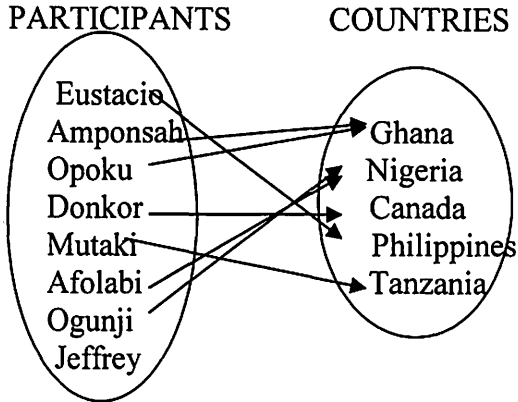
THE BASIC MATHEMATICAL CONCEPTS OF FUNCTIONS.

The Concept of Relations

In mathematics a relation associates elements of one set with elements of another set. This mathematical concept helps us to examine the correspondence, association, or the relationship between elements of two sets. A set is any well-defined collection of objects. The objects in a set are called elements or members and a well defined collection means we can easily identify objects that belong to the collection and objects that do not belong to the collection.

EXAMPLE 1:
Suppose I associate eight participants with the countries they come from, the arrow diagram shows the relation between the eight participants and the five countries.

ARROW DIAGRAM 1

PARTICIPANTS   COUNTRIES

In the diagram, each arrow associate each participant to the country that he comes from. For example Amponsah and Opoku come from Ghana. Afolabi and Ogunji come from Nigeria. Likewise we can state that of Eustacio and Donkor. We see that Jeffery does not come from any of the five countries.
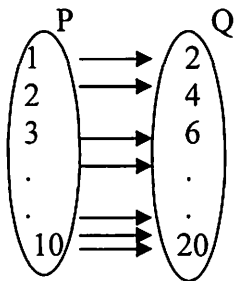
Suppose we make
A = {Names of eight participants listed}
B = {Names of five countries mentioned}

The relation "comes from" or "lives in" associate elements in B with elements in A.
We then use the symbol **R** to denote a relation. The notation, A ———➤ B or A **R** B, a ε A and b ε B, means that there is a relation between elements of A and B. Specifically we write, Amponsah **R** Ghana, which reads, Amponsah comes from Ghana. We can also write, Afolabi comes from Nigeria as, Afolabi **R** Nigeria.

EXAMPLE 2:
If we consider the sets, P = {1, 2, 3… 10},and Q = {2, 4, 6…20}, the arrow diagram below, suggests the relation "is half of"

ARROW DIAGRAM2

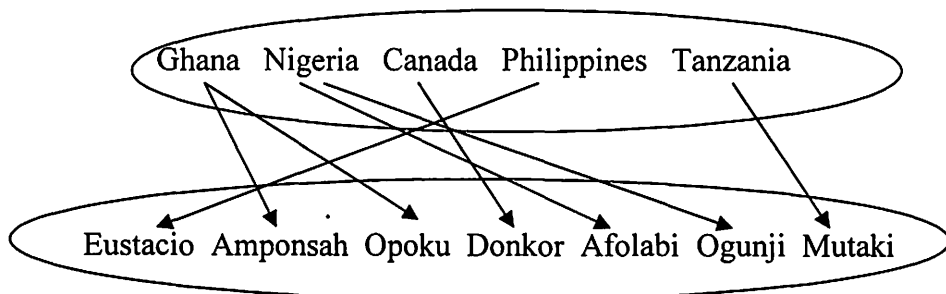That is, 1 is half of 2, 2 is half of 4… 10 is half of 20.
Symbolically, we write, 1 **R** 2, 2 **R** 4… 10 **R** 20.
We notice that if we change the order of the elements and write, 2 **R** 1, 4 **R** 2, …, 20 **R** 10, then we need a new relation "is double"
For example, 2 is double 1, 4 is double 2, …, 20 is double 10.
This means the order of the elements in a relation is important.
Although a relation may exist between two sets, not every element of the first set will necessarily be associated with an element of the second set. Look back at arrow diagram one and check this.

ARROW DIAGRAM 3

There are several types of relations: Such as,

a) **One-to-many**, as in arrow diagram3. Here one element in the first is associated with more than one in the second set.

b) **One-to-many**, as in arrow diagram1.More than one first set are associated with one element in the second set.

c) **One-to-one**, as in arrow diagram 2. Each element the first is associated with only one element in second set.

From what has been discussed so far, we can also defined mathematical relation as **a rule** or a **statement** that associate elements of one set to another.

SPIRITUAL LESSONS FROM THE CONCEPT OF RELATIONS

God's creation of man is based on the mathematical concept of relations. The order in the creation of man is that, man is the image of God. We can therefore write, man **R** God which reads "Man is the image of God." If you replace man by individual names it gives clear meaning, individuals in the first set and only God in the second set. This is many-to-one relation. Since the order of elements in a relation is important, it means that we as individuals are the images of God. We are not Gods as is being proposed by others.

The fall of man was the result of his attempting to change the order. That is to be a god. As it is impossible for man to create, we can only be truly man by relating to God as His image. Man's desire to be God destroyed the relation. In arrow diagram 1, not all elements in the first set are associated with elements in the second set under the relation "comes from". Likewise under the spiritual relation, "is the image of" not all objects of God's creation are his image. The result of that is the command, by God, "let them have dominion over the fish of the sea, over the birds of the air, over the cattle, over all the earth and over every creeping thing that creeps on the earth". (Gen 1:26). From the quotation there is a mathematical relation between man who is the 'image of God' and the other things (man's environment) He has created. The relation is 'has dominion over his'. Thus man **R** things in the environment or the image of God **R** things in environment reads man 'has dominion over his' things in the environment or the image of God 'has dominion over his' things in the environment. Hence man as the "image of" God has dominion over things in his environment.

Man's inability to subdue the environment is that, the relation is destroyed. Thus God's statement "cursed is the ground for your sake; in toil you shall eat of it all the days of your life. Both thorns and thistles it shall bring forth for you. And you shall eat the herb of the field. In the sweat of your face you shall eat bread. Till you return to the ground. For out of it you were taken; for you are dust and to dust you shall return" (Gen 3:17-19), (and others he said previously) confirms the results of man changing the order of elements in God's creation under the mathematical relation "is the image of". Man not living as "the image of" God has led to disorder of God's creation on earth.

Jesus seeing His rejection by man as the result of man not "in the image of" God also predicted. 'For nations will rise against nations and kingdoms against kingdoms. And there will be famines, pestilences, and earthquakes in various places.' (Matt 24:7). These are consequences of man not being under the relation, man 'is the image of' God.

Furthermore under the relation the image of God **R** environment which reads the image of God has dominion over his environment one can see a clear meaning of that in Genesis 2: 15. It reads, "then the Lord God took the man and put him in the Garden of Eden to tend and keep it." The relation "has dominion over his" can be stated as "to tend and keep his". Therefore it can be stated the image of God is to tend and keep his environment. Again reading from Genesis 1:27 to 2:17 shows that to have dominion over his environment even included what was to be eaten and what was not to be eaten. As result of sin man has lost the ability to tend and keep his environment. This has resulted in environmental degradation, wrong eating habits, drug abuse, economic mismanagement, diseases, filth, political dictatorship, robbery, and many other increasing forms of social vices.

The Seventh Day Adventist's Christ-centred education system is to reverse the downward trend of God's creation. Adventist Educators do not lose sight of the fact that our educational objective is to redeem and restore the image of God within ourselves and our students through Christ.

At Valley View University in Ghana we are concerned with transforming the life of our students towards God's image like all Adventists Universities. Despite the lack of concern for inappropriate dressing in most of our countries universities we insist on appropriate dressing base on our cultural values with faculty as living example. Our courses of instruction as a general requirement include Health principles and Human Body to help our students to understand the appropriate Christian lifestyle. Also HIV/AIDS has been introduced recently as a course compulsory for all students aimed at creating the awareness of the disease in order to reduce its spread and educate the student about the correct lifestyle to avoid the disease. Concerning our environment, careful planning and attention is being given to the layout of our campus as a young university. Faculty, staff and students are all involved in making and maintaining the natural nature of our campus, keeping it neat and attractive at the admiration of visitors. In my interaction with students I say the university does all these things because she is living by the mathematical biblical illustration that man is to "tend and keep his" environment.
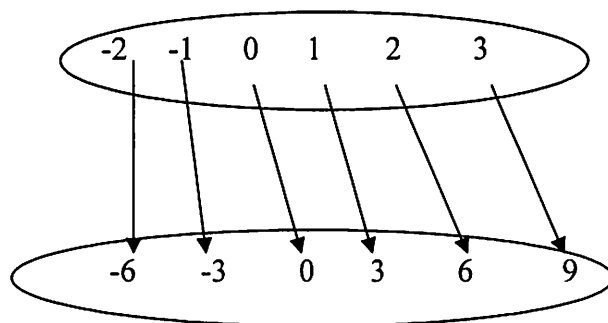
MAPPINGS

A participant was required to draw the arrow diagram of multiplication by 3 on the members of the set,
A = {-2, -1, 0, 1, 2, 3}. He put the result in the set, B= {-6, -3, 0, 3, 6, 9}
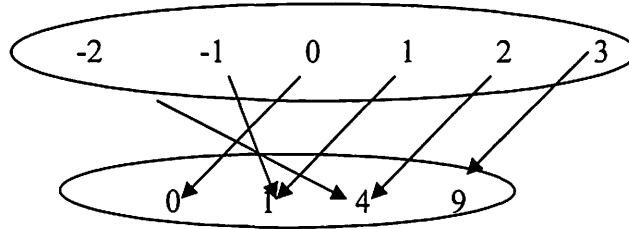The arrow diagram is shown in table 3 as follows:

Table 3

Another participant was required to square the numbers in the set A, and drew the arrow diagram in Table 4.

Table 4

In both cases, each element in set A has an image in set B. This is a special kind of relation called a mapping.

A mapping is therefore defined as a relation, in which each member of the first set has an image in the second.

The mapping in Table 3 is called a one-to-one mapping and that of Table 4 is called a many-to-one mapping

In Table 3 the rule for the mapping is number _____⟶ trice the number.
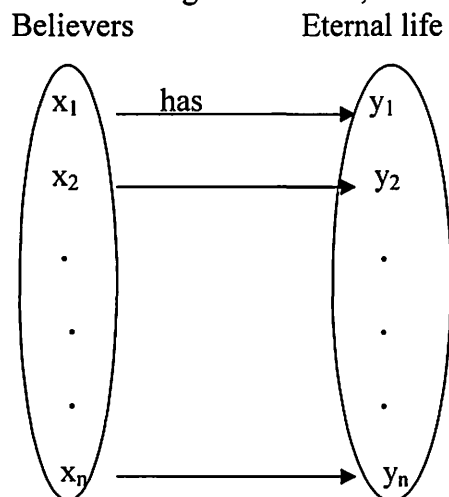
In Table 4 the rule for the mapping is number _____⟶ square of the number.

The domain of the mapping is made up of the elements in the first set. The range of the mapping is the set of images of the domain. In Table 3 the domain is, {-2, -1, 0, 1, 2, 3}, and the range is, {-6, -3, 0, 3, 6, 9}.

SPIRITUAL ILLUSTRATIONS OF MAPPINGS.

God has called us to be Christians by choice. Anyone who responds to the call is given salvation. The gospel of John states: "For God so loved the world that he gave his only begotten Son, that whosoever believes in Him should not perish but have everlasting life." (John 3:16).

The quotation is one of the most important statements in the Bible to me. It is a mapping because all believers have eternal life. It is a message of hope to all believers and therefore its illustration is very important. By the arrow diagram we have,
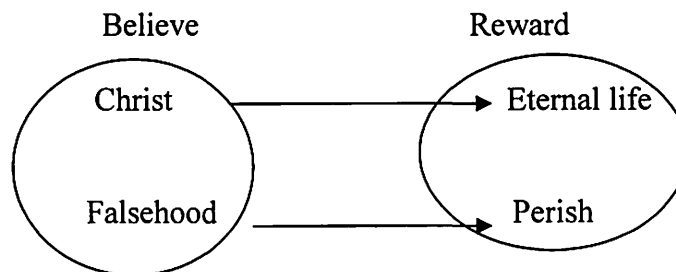
Believers   Eternal life

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The rule is "has". We can generally say believers have eternal life. It implies that believer x_1 has eternal life y_1 since every man is unique under this mortal life, his eternal life y_1 is also unique. Thus

$$x_1 \, R \, y_1, \quad x_2 \, R \, y_2, \quad \ldots \, , \, x_n \, R \, y_n.$$

Again, after a careful reading of John 3:16, one can easily see that the emphasis on believe is very important. It is also a fact of life that every human being believes in something. In other words there is no one without a belief. Hence there are only two alternative in life. To believe in Christ who is the truth and "maps" to "eternal life" or not to believe in him but to believe in falsehood and "maps" to "perish". John 3:16 can therefore be illustrated as a one-to-one mapping by an arrow as follows:

Believe   Reward

Christ ————————→ Eternal life

Falsehood ——————————→ Perish

The Seventh Day Adventist Education system emphasises the importance of belief in human life and what to believe to have eternal life. Our students after completing university education must not be in doubt as to what he or she believes in. In teaching mathematics in the classroom mainly to Business students, I at times state mathematical formulae without proof. I normally tell my students that the proof at their level is difficult to understand and they need only to believe that they are true and apply them. I then go further to say that God requires us to believe in him and Christ, and not to understand him, to have eternal.
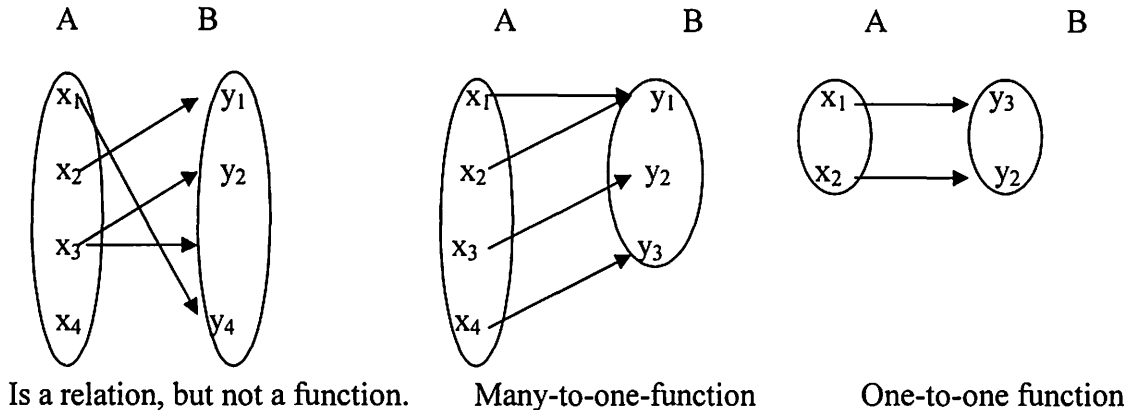
FUNCTIONS.

There are many practical situations, in which the value of one quantity depends on the value of a second quantity. For example, the consumer demand for bread may depend on the current market price; the amount of air pollution in a city environment may depend on the number of cars used in that city; the value of an asset may depend on its age. Such relationships are often represented mathematically as functions.

Generally speaking, a function consists of two sets and a rule that associates elements in one set with elements in the other set. For instance, suppose you want to determine the effect of school fees on school enrolment for a certain period of time. To study this relationship, you need to know the set of school fees for a certain period of time and the number of school enrolment for that period, and a rule for associating each school fees with its number of school enrolment. We then give the definition of functions as:.

Definition: A function is a rule that assigns to each object in a set A, exactly one object in a set B. The set A is called the domain of the function and the set of assigned objects in B is called the range.

From here, it is clear that functions are relations but not all relations are functions. We use the following diagrams to make clarifications.

Is a relation, but not a function.   Many-to-one-function   One-to-one function

To make the ideas we want to illustrate very simple to a layman, in my mathematical illustrations the domain and range used will be collections of real numbers. Functions are denoted by letters such as f, g, h, and so on. The value that the function assigns to x in the domain is denoted by f(x) (read as "f of x"). Functions can also be thought of as a "mapping" from numbers in A to numbers in B through a process indicated by functional rule. A function is also defined in another way as:

A function is a rule (process or method) that produces a correspondence between one set of elements, called the domain and a second set of elements called the range, such that to each element in the domain there corresponds one and only one element in the range.   So we have

$$x \longrightarrow y \text{ or } x \longrightarrow f(x), \text{ where } y = f(x).$$

We can therefore comfortable state that, $y = f(x)$, means y depends on x or the value of y depends on the value of x in the function.
The variable x is called an independent variable since values are independently assigned to x from the domain, and y is called a dependent variable since the value of y "depends" on the value assigned to x. In general, any variable used as a placeholder for domain values is called an independent variable; any variable that is used as a placeholder for range values is called a dependent variable.

SPIRITUAL LESSONS FROM FUNCTIONS

From John 3:16, "God gave His only begotten Son that whosoever believes in Him should not perish", it shows clearly that man's eternal life depends on the Son. Hence man depends on the Son or man is a function of the Son. To illustrate this mathematically I need other established truth to clarify any point I make.

Another truth is John 1:1, "In the beginning was the Word and the Word was with God, and the Word was God." Also John 1:4 states "And the word became flesh and dwelt among us and we beheld His glory, the glory as of the only begotten of The Father, ...". The Son is

therefore the Word. I can therefore restate John 3:16 as, God gave his Word that whosoever believes in the Word will not perish. This means that man is a function of the Word or man is the image of the Word. Believe can also be explained as keeping the word of God or obeying the word of God. John 8:51 states "Most assuredly, I say to you, if any one keeps my word he shall never see death." Hence to believe is to keep the word of God. Believe can also be interpreted as to know. "And this is eternal life, that they may know you, the only true God, and Jesus Christ whom You have sent." (John 17:3). Simplifying John 3:16, we can restate it again in several ways as;

God gave His 'Word' that whosoever keeps Him will not perish.

God gave His 'Word' that whosoever knows Him will not perish.

From here we cannot interpret believe and knowledge loosely. To believe or to know is to experience and do. For the loose believe it is stated this way:

"You believe that there is only one God. You do well. Even the demons believe and tremble!" (James 2:19). For mental knowledge, James still has it clear, "But be doers of the word, and not hearers only, deceiving yourselves." (James 1:22). To perish is not to have eternal life but to have eternal life is God's image, since God is eternal. Hence we must therefore recall the statement I made previously, man is the image of God or Man **R** God.

To be able to define my domain and range under the spiritual lessons of functions I will still clarify the Son and the Word. Jesus said, "I am the way, the truth and the life."

(John 14:6). Hence Jesus is truth. We can therefore equate Jesus and truth. Thus

Truth = Jesus. In our real world we have two sources of knowledge.

- Knowledge of God which is truth or Christ.
- Knowledge of the devil which is falsehood.

Here we must take all truths as truth and all falsehoods as falsehood. My domain in the spiritual world is therefore the set of truth and falsehood. Thus

Spiritual World = {Truth, Falsehood} = {Christ, Satan}.
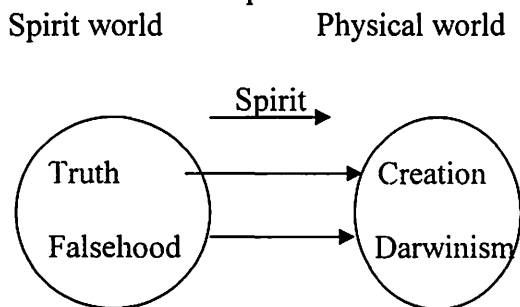
The range is the Physical World = {Creation, Darwinism}.

We now have to look at the function which is the spiritual machine or the method.

Consider the following statements.

"Nevertheless I tell you the truth. It is your advantage that I go away; for if I do not go away the Helper will not come to you; but if I depart, I will send Him to you. And when He has come, He will convict the world of sin, and of righteousness and of judgement: of sin, because they do not believe in Me;" (John 16:7-9). "However, when He, the Spirit of truth, has come, He will guide you into all truth; for He will not speak on His own authority, but whatever He hears He will speak; and He will tell you things to come." (John 16:13).

It is therefore clear that the Spirit is the function. He will therefore identify men who depend on truth and men who depend on falsehood. We therefore have this arrow diagram.

Spirit world   Physical world

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Letting x = truth or falsehood, and y = creation or Darwinism and S= the function which is the Spirit, we have, $y = S(x)$.

If x_1 = Truth, x_2 =Falsehood, y_1 = Creation and y_2 = Darwinism, then $y_1 = S(x_1)$ and $y_2 = S(x_2)$. Thus $y_1 = S(x_1)$ means that y_1 is function of truth. The Spirit will guide into all truth or the Spirit will convince the believer that creation is truth. $y_2 = S(x_2)$ means that Darwinism depends on falsehood (things not from God). The Spirit will convince the world of falsehood

There is one-to-one correspondence between elements of the Spiritual world and elements of our physical world. There are two sides of whatever is done in our physical world. True human belief is from Spiritual truth and false human belief is from spiritual falsehood. Thus we have true Science and false science, true Culture and false culture, true practices and false practices and so on.

Truth is from God and is independent. Falsehood is not from God and is what God is not. It is also independent of our physical world. True science is dependent on the Science of God, true culture is dependent on God's culture and true practises are dependent on God's practises. In the same way false science, false culture and false practises are dependent on falsehood. Since truth and falsehood are disjoint there is no middle way or neutrality here. Anyone who is not a function of truth is a function of falsehood. In other words anyone who does not depend on truth depends on falsehood. To depend on truth is to believe in God and do what he says, but to depend on falsehood is not to believe God and reject what he says. From the Christian point of view truth is any statement which does not contradict the word of God. It is therefore important that in our classroom Adventist teachers must point out statements which contradict the word of God and caution our students. As all truths are God's truths no matter where ever they are found, Adventists educators must present truths in their discipline as revelations from God and that students are obliged to apply them in their lives where they are applicable. In my mathematics teaching I always tell my students that mathematical principles, concepts, formulae and theories do not contradict the word of God and can be used to illustrate what he has said.

From my previous illustration $y_1 = S(x_1)$ if y_1 is God's creation and x_1 = God's word, then the science that deals with the study of God's creations is a true science because it depends on God's word. The science that deals with the origin of things without God (that is "and God said") is a false science.

Again one can see in the illustration that the Spirit of God denoted by S is very important, This indicates that teachers can teach the truth all right but if the Spirit of God does not dwell in our students, whatever truth is taught cannot change them to lead godly lives. Christian educators must therefore not only teach the truth but create an environment that enables the Spirit of God to dwell in our students. This confirms the Christian slogan not by might but by the Spirit. The teaching of truth which is a revelation from God needs the Spirit of God to transform the life of the student who is taught. Since the Spirit of God does not dwell in human heart by force teachers have difficult task in preparing student to willingly receive the Spirit. Adventist teachers need not be harsh in dealing with students.

FUNCTIONS DEFINED BY EQUATIONS.

If in an equation in two variables, we get exactly one output (value for the dependent variable) for each input (value for the independent variable), then the equation defines a function. Thus the expressions

$$F(x) = x^2+1 \qquad G(x) = x^3-3x+1 \qquad H(x) = 2x+1$$

are mathematical functions. Functions are expressed in terms of the independent variable. Since the functions are expressed in terms of only one variable they are called functions of one variable. The equation $y = f(x)$ means that y is expressed in terms of x. that is why we say y is a function of x. The function involving two quantities are done by mathematical modelling.

SPIRITUAL ILLUSTRATION.

Christ said, "abide in Me, and I in you. As the branch cannot bear fruits of itself unless it abides in the vine, neither can you, unless you abide in Me. I am the vine, you are the branches. He who abides in Me, and I in Him, bears much fruit; for without Me you can do nothing."

Here there is a functional relationship if y = a Christian, then as illustrated previously y = S(x). Every Christian depends on Christ or the word or truth. Life has meaning as Christ or the word gives. It is the value of the word that gives value to Christian life. Without Christ life is meaningless. Again it is the Spirit that expresses life in terms of Christ the word. The Spirit determines our value as to how we respond to Him. Also our values must be in one-to-one correspondence with that of Christ. That is any behaviour or activity of a Christian must depend on God's revealed truth to man.

As we cannot quantify how we respond to the Spirit on a particular truth, we can only say that a particular value of Christ in us is high or great when we respond to the Spirit quickly. The expression of the spiritual equation is done by spiritual modelling. The world is full of relationships or functions with the spiritual equation $y = S(x)$ very important. We can define the relationship between the spiritual and the physical world by a piecewise function.

$$S(x) = \begin{cases} \text{Creation, if } x = \text{truth or God's word} \\ \\ \text{Darwinism, if } x = \text{falsehood} \end{cases}$$

The church of God's creation which is the true church depends on only truth (that is "and God said"). A church that believes in Darwinism depends on falsehood. Jesus stated clearly; "And in vain they worship Me, Teaching as doctrines the commandments of men." We also have sons of God and sons of men (Genesis 6: 1-4) which we can also define as a piecewise function.

$$S(x) = \begin{cases} \text{Sons of God, if } x = \text{truth or God's word} \\ \\ \text{Sons of men, if } x = \text{falsehood} \end{cases}$$

When x = truth, S(x) = Sons of God, thus truth $\longrightarrow$ Sons of God.
When x = falsehood, S(x) = Sons of men, thus falsehood $\longrightarrow$ Sons of men.

Since in the spiritual world, truth and falsehood are disjoint and the physical world is a function of the spiritual world, there are only two physical world views. Thus the Creationist view is the image of truth and the Darwinist view is the image of falsehood. It is clearly noticeable that most Christians now believe in Darwinism. This is eventually leading to a global state of affairs which is as follows. "And God saw that the wickedness of man was great in the earth, and that every imagination of the thoughts of his heart was only evil continually." This description was given as result of the sons of God partnership with the son of men. Adventist teachers are to make our universities different in their teaching of knowledge to bring up students who are different in their imaginations and thoughts.

Since truth is the knowledge of God or Christ, and as Christians we do grow in the knowledge of God or Christ we can quantify knowledge. It is stated in the Book of Daniel that 'knowledge shall increase' (Dan 12:4). This means that knowledge of God by man is measurable. The wise man said 'The fear of the Lord is the beginning of wisdom, but fools despise wisdom and instruction.' (Proverbs 1:7).
To fear God is to recognize his existence and accept him as creator of the world. This is zero in terms of numbers. To increase in the knowledge of God or truth are the positive numbers. To reject God is the beginning of foolishness or falsehood which is also zero. To increase in this rejection or falsehood are the negative numbers. Hence there is one-to-one relation between the level of God's knowledge and numbers. If x = the amount of knowledge of God, and y = S(x) where y represents any man's knowledge, then man's knowledge shall increase both positively or negatively. In my informal discussions with students I support my illustration with what Jesus said will happen to our world because of the increases in falsehood (negative knowledge). He said, "For there will be great tribulation, such as has not been since the beginning of the world until this time, no, nor ever shall be." (Matthew 24 : 21).

It is the Spirit that measures the level of God's knowledge in our physical world. The Spirit convicts everyman if his or her experiential knowledge is positive in terms of truth or negative in terms of falsehood.
Also in terms of man's knowledge of truth or Christ
y = S(x), where x = the amount of knowledge of truth or Christ is important because the Spirit guides (teaches) into all truth. The Spirit also convicts the world of sin or falsehood where x = the amount of falsehood and y = S(x) is the image of falsehood in man. For the Spirit convicting man in falsehood, Paul states, "For the invisible things of him from the creation of the world are

clearly seen, being understood by the things that are made, even his eternal power and Godhead so that they are without excuse … ." (Romans 1: 20 – 25). Furthermore, as man grow in stubbornness to increase in falsehood they exhibit certain 'images' or lifestyle, denoted by S(x), which is the evidence of their increasing ungodliness. On this Paul again states, "For this reason God gave them up to vile affections: For even their women exchanged the natural use for what is against nature. … ." (Romans 1 : 26)
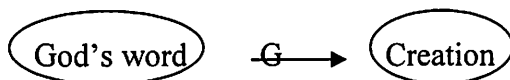
TYPES OF FUNCTIONS

Functions are classified by how the dependent variable is expressed in terms of the independent variable. We have

- Polynomial function: $f(x) = a_nx^n + a_{n-1}x^{n-1} + \ldots + a_2x^2 + a_1x + a_0$ where $a_n, a_{n-1} \ldots a_1, a_0$ are real numbers and n is a positive integer.
- Rational functions: $h(x) = f(x)/g(x)$ where $f(x)$ and $g(x)$ are polynomials, $g(x) \neq 0$
- Logarithmic functions: $f(x) = \text{Log } x$, $b > 1$ and $x > 0$
- Exponential functions: $f(x) = b^x$
- Absolute value function: $f(x) = |x|$
- Trigonometric functions: $f(x) = \text{Sin } x$, and so on

SPIRITUAL ILLUSTRATIONS

Functions (relationships) are from God because Creation is a result of functions. God relates to his creation by his word. Thus creation depends on God's word. Thus if,
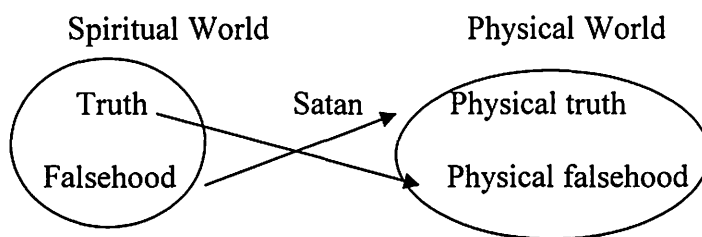G = God, x = the word, C = creation, then C = G(x) or

God did not create the world out of nothing. The world was created by the word. "Without the word nothing was made that was made." (John 1:1).
The world is therefore full of relationships or functions. Anything that exists by rule, or is a process or method is a function. Christianity which is a way of life (the process or method of becoming a Christian or Christ-like) is a function. It is the relationship between Christ and a Christian. Thus if
S = the Spirit, x = the word or Christ, and C = the Christian, then C = S(x).
This means a Christian depends on God's word by His spirit.
Satan is a function. He changes God's word or truth to physical falsehood and falsehood to physical truth.

This really happens when one stubbornly resists the Spirit of God and Satan takes control of him. For a committed Christian it is the Spirit of God who determines our worth or how

godly we are. When one yields to the Spirit of God that one is guided into all truth. Hence anyone guided by the Spirit will not be confused or neutral concerning the truth. It is as the Spirit expresses the word of God in us.

As we have seen different types of functions, we can deduce that everyone relates to God differently in the Spiritual function. This is evidenced by our uniqueness. Though we all have the same Spirit, God's gifts to us in terms of our mission to the world are different.

EVALUATION OF FUNCTIONS AND PREDICTIONS

It has already been explained that whenever we write $y = f(x)$, then x is the independent variable and y is the dependent variable. If we have,

$$f(x) = 2x + 1 \text{ and } g(x) = x^2 + 2x - 3,$$

then to find f(3), we replace x with 3 wherever x occurs in $f(x) = 2x + 1$.

Hence we evaluate f(3) as $f(3) = 2(3) + 1$

$$= 7.$$

Thus f assigns the value 7 to the x value 3

Similarly $g(-5) = (-5)^2 + 2(-5) - 3$

$$= 25 - 10 - 3$$

$$= 12$$

Thus g assigns the value 12 to the value -5.

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For the function $C = S(x)$ where C = Christian, S = Spirit and x = Christ or truth, it means that the value of a Christian depends on the amount of knowledge of Christ. This illustrates Christ statement, "for without Me you can do nothing."(John 15: 5). The function also illustrate that Christians depend on Christ by the Spirit of God.

The message of redemption to a Christian is that Christ is our substitute. He suffered on our behalf that we might be saved. Isaiah 53:5-6 reads, "But He was wounded for our transgression, He was bruised for our iniquities. The chastisement for our peace was upon Him. And by His stripes we are healed. All we like sheep have gone astray; We have turned everyone, to his own way; And the Lord laid on Him the iniquities of us all." As we substitute the value of the independent variable to obtain the value of the dependent variable, so by our functional relationship (dependence) with Christ, He is our substitute in terms of his suffering, death, and the restoration of eternal life. The Spirit as the function assigns the eternal life value to the life of Christ. Romans 8 : 11 reads; "But the Spirit of Him who raised Jesus from the dead will also give life to your mortal bodies through His Spirit who dwells in you.

Furthermore, since by the functional relationship $y = f(x)$, we can evaluate y by any given value of x, in a similar manner, as we relate to Christ by His Spirit, He can evaluate and predict our worth in terms of our knowledge of Him. Christ is our substitute if whatever we do is Christ. For this we are advised to put on Christ. Romans 13 : 14 reads, "But put on the Lord Jesus Christ, and make no provision for the flesh to fulfil its lust." When we reject Christ the Spirit leaves us and Satan takes control over us since the Spirit cannot accept falsehood. To avoid this situation, Paul writes, "Therefore let us cast off the works of

darkness, and let us put on the armour of light. Let us walk properly, as in the day, not in revelry and drunkenness, not in licentiousness and lewdness, not in strife and envy.

It has also been established that creation resulted from the word of God. Hence the entire world depends on the word of God buy His Spirit. One can therefore write $W = S(x)$ where, W = the World, S = the Spirit of God and x = the truth or falsehood. As we evaluate y by assigned value of x, so also an event in the world is predicted by its assigned value of truth or falsehood. For example by this relationship there is prediction in 2 Timothy 3: 1-5, which reads, "But know this, that in the last days perilous times will come; For men will be lovers of themselves, ...".

THE LIMIT OF A FUNCTION

We will approach this important concept of mathematics intuitively rather than formally. Therefore our definition of limits for the purpose of this presentation will be informal.

Definition: If f(x) gets closer and closer to a number L as x gets closer and closer to a number c from both sides, then L is the limit of f(x) as x approaches c. The behaviour of is expressed by writing

$$\lim_{x \to c} f(x) = L$$

Roughly speaking, the limit process involves examining the behaviour of a function f(x) as x approaches a number c that may or may not be in the domain of the function. This limiting behaviour occurs in a variety of practical situations. For example, it said that absolute zero, the temperature T_c at which molecular activity ceases can be approached, but never actually attained in practice. Similarly, economists who speak of profit under ideal conditions are really dealing with limiting behaviour since ideal conditions is not attained in our world.

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Christ manhood was a perfect reflection of God. "For in Him dwelleth all the fullness of the Godhead." (Colossians 2: 9). As mortal beings we at any point in time do not perfectly reflect Christ. Hence we are advised to grow in Christ. The truth revealed to us by the Spirit about Christ is not fully comprehended. "For we know in part ... But when that which is perfect has come, then that which is in part will be done away." (1 Corinthians 13: 10-11). Christ lived perfectly the truth revealed by the Spirit of God to Him as a man. So as the Spirit of truth lead us gradually to Christ we approach the manhood of Christ. Therefore Christ is our limit. By the act of sanctification we approach Christ daily but will not attained His perfect nature on earth.

CONTINUITY OF FUNCTIONS

The Oxford Advanced Learner's dictionary defines continuity as, "the fact of not stopping or changing; a logical connection between the parts of something, or between two things." Looking at the informal mathematical definition of continuity I will explain that a continuous function is one whose graph can be drawn without the "pen" leaving the paper or is a graph without a "hole or gap". For real valued functions, continuity means, for any real number x, in the interval a < x < b, where a, and b, are real numbers the function f must assigned a real value f(x). Not all functions have this property. For any real value x, within the interval

a < x < b, where f(x) does not exist, we say that the function is discontinuous at that point.

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As real numbers are infinite and God is infinite, there is a one-to-one correspondence between real numbers and the amount of God's knowledge. Since real numbers are continuous (there are no gaps in real numbers), it means the amount of Gods knowledge is continuous. Therefore the relation, $C = S(x)$, where, x = the amount of truth, C = the Christian, and S = the Spirit of God, a Christian is expected to live by all revealed truth. As Christians are enjoined to always "put on Christ", it means $S(x)$ must be continuous. That is there must be no "gaps" between a revealed amount of truth and the Christian life. We must at every point of truth reflect Christ. Discontinuity in a Christian life in terms of reflecting Christ is the result of human weakness or stubbornness.

FUNCTIONS OF TWO VARIABLES

There are many practical situations in which a quantity of interest depends on the values of two or more variables. For example the volume of water in a community's reservoir, may depend on the amount of rainfall as well as the population of the community, and the output of factory, may depend the amount of capital invested in the plant, the size of the labour force, and cost raw materials. As I am going to consider functions two variables, I will define it as follows:

Definition: A function f, of the two independent variables x, and y, is rule that assigns to each ordered pair (x, y), in a given set D (the domain of f) exactly one real number, denoted by f(x, y).
For example, we have, $f(x, y) = (x - 1)^2 + 2xy^3$ and $g(x, y) = \sqrt{(x^2 - y^2)}$.

We can think of functions of two variables f(x, y) as "machine" in which there is a unique "output" f(x, y), for each "input" (x, y).Since I am dealing with real valued functions, I will restate the definition as follows: A function f, of the two variables x, and y, is a rule (process, method or machine) that assigns to (produces) each input ordered pair (x, y) in some set D, one and only one output element denoted by f(x, y).

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The Great Commission can be illustrated as a function of two variables. It reads, "Go therefore and make disciples of all the nations, baptizing them in the name the Father and of the Son and the Holy Spirit, teaching them to observe all things that I have commanded you, and lo, I am with you always, even to the end of the age." (Matthew 28 :19 – 20).
It is the task of every Christian to "make" or "produce" disciples. Hence the image of the two variables function is a Disciple, D. In the great commission we are obliged to "teach them to observe all things that Christ has commanded." To teach involves imparting what Christ has commanded, which is the knowledge of the truth denoted by x. To observe what Christ has commanded involves living by the truth, which is demonstrated by the lifestyle of the Christian which is denoted by y. It has already been established that the Spirit of God, denoted by S, is always here with us in the name of Christ.
Hence we have $D = S(x, y)$.

COMPOSITION OF FUNCTIONS

New functions can be formed from old functions by a method which is called composition.

Let $f(x) = \sqrt{x}$, $g(x) = x+3$

For $x = 1$, $g(1) = 4$ and $f(4) = 2$. We took a number ($x = 1$) in the domain of g, found its associated function value (4), and then evaluated f at 4. A schematic of the process is shown as

$$1 \longrightarrow 4 \longrightarrow f(4) = 2$$
$$X = 1 \longrightarrow g(1) = 4 \longrightarrow f(g(1)) = 2$$
$$\therefore x \longrightarrow g(x) \longrightarrow f(g(x))$$

The two steps process, depicted in the schematic, is a function that assigns to x in the domain of g a number f(g(x)) in the range of f. The domain of the function is the subset of the domain of g for which f(g(x)) is a real number. We call the function the composition of f and g and we denote it as f o g.

Definition:

The composition functions f and g is defined by the equation $(f \circ g)(x) = f(g(x))$.

The domain of f o g is the set of all x in the domain of g for which g(x) is in the domain of f.

For example, if $f(x) = \sqrt{x}$ and $g(x) = x+3$

$$\text{then } (f \circ g)(x) = f(g(x)) = \sqrt{g(x)}$$
$$= \sqrt{(x+3)}$$
$$\text{and } (g \circ f)(x) = g(f(x))$$
$$= f(x)+3$$
$$= \sqrt{x} +3$$

Again, if $f(x) = x^4$ and $g(x)) = x^2-5$, then

$$(f \circ g)(x) = f(g(x))$$
$$= (g(x))^4$$
$$= (x^2-5)^4$$
$$\text{And } (g \circ f)(x) = g(f(x))$$
$$= (f(x))^2-5$$
$$= x^8-5$$

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God created us as special beings. This means we must depend on each other to make life meaningful. Life is therefore a composite of functions or relationships.

If $C=S(x)$ where c =Christians S=the Spirit, x=the word, also f=S(c) those in the community who depend on c, then $S(c)=S(S(x))=(S \circ S)(x)$. This means through us people will accept the word of God.

Let u=Adventist universities, then u=S(x). If a = Adventist students, then a = S(u). Thus $a=S(u)=S(S(x))= (S \circ S)(x)$.

This means through us our students will know the word of God.

Conclusion:

Mathematics has been consistent since it is based on consistent principles. Functions as mathematical concept therefore has consistent principles. It has also been illustrated that creation is a function of God's word. That is, if x = God's word and S = the Spirit and C=Creation, then C=S(x).

This means that any creation depended on the exact word spoken by God. If the Bible is therefore studied in terms of God's mathematical relationship (function) to man, apparent contradictions can be resolved.

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