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Introduction to Quantitative Approaches for Triangulation in International Relations: A Basic Guide

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Abstract: In today's digital era, information flows through multiple channels and a large amount of data becomes available on a daily basis. Government sources, social media, international organisations, and even business corporations use numerical data to communicate with the general public. The recent devastating global pandemic that affected every part of the world is a typical example of this reality. During the pandemic, each government chose a course of decisions and actions that were made based on statistics. International Relations, an interdisciplinary field of study that combines economics, history, and political science to investigate issues such as global poverty, economic growth rates, globalisation, security, and climate change, also employs mathematical formulae and statistical models to produce specific results. Therefore, quantitative methods for research are a key tool available to scholars, researchers, practitioners, and university students of IR. Under this prism, this article focuses on the importance of quantitative methods for triangulation in IR. Quantitative approaches, such as Game Theory and Statistical Analysis, are vital not just as independent research methodologies, but also as important components of qualitative research in IR. The main argument of this paper is that the choice between qualitative-quantitative research remains vivid among IR scholars. Nonetheless, this appears to be a case of synergy rather than antagonism between the two. Under this scope, this work shall highlight the relevance of quantitative approaches for triangulation in IR qualitative research, providing examples of certain research cases.

Keywords: International Relations, Quantitative, Qualitative, Triangulation

1. Introduction

Research in IR draws material from adjacent areas of study such as political science, sociology, economics and many others. This inter-disciplinary relationship embarks the need to utilise a wider range of methodological approaches. Thus, IR research agendas are not limited to a single or a narrow range of methods. This pluralism in research approaches includes qualitative methods as well as quantitative methods and their combination. However, handling quantitative research methods can be a challenge for scholars that often lack the appropriate mathematical background. Indeed, mathematics is approached with caution and hesitance [14]. Nevertheless, mathematics and its importance on any field and specifically on IR is unquestionable. The main question is: Why are quantitative approaches so important in research?

The quantitative methods choice is based on the following premises:

1. They exceed the boundaries of descriptive language.
2. They offer results with precision.
3. They can be used as tools for measurement.
4. They provide explanation for any differences, trends and types of relationship that exist among variables.

Quantitative methods have been analysed and discussed by a series of academic works (such as [13, 15, 3, 28, 14]). This article seeks to show that quantitative approaches are not only important as independent research methods, but that they can also, alone, be an important part of qualitative research in IR. Thus, this work seeks to highlight the relevance of quantitative approaches for triangulation in IR qualitative research, providing examples of certain research cases.

This article is structured into five sections: the first section

introduces the triangulation method and its complementary nature in research, while the second section underlines the practical differences between qualitative and quantitative methods. The third section outlines two main frameworks that researchers can work with in quantitative methods: the Game Theory and Statistical Analysis, which are presented along with examples. Subsequently, the fourth section gives prominence to certain issues applying Game Theory methods on IR, concluding with a brief section on statistical analysis. The article closes with some further remarks.

2. Triangulation and Complementarity

There is often the need in research to verify acquired data sets, validate the method of data gathering, or enrich findings for a more in-depth analysis [14]. This is especially true in qualitative research that is based on interpretation, requiring data to corroborate and maximise the validity of research. This can be done by triangulating data, which means using a multi-method technique of data gathering or analysis [21]. Triangulation has been gaining recognition in recent years across disciplines [11] to ensure vigorous outcomes and/or enhance findings [21]. There are multiple triangulation designs that offer different desirable outcomes. However, this article focuses on the complementarity aspect of triangulation in IR. The useful characteristic of complementary triangulation is that researchers are not required to understand the secondary methods of research [11]. Hence, IR researchers can choose to use quantitative methods solely for complementary purposes.

Complementary triangulation aims to establish a clearer and extended picture of the issue that is being researched. The results from different methods are not expected to verify each other, i.e. being similar to each other, but are rather used to complete or enhance each other [21]. Moreover, it can help ensure that the audience is not misinformed by misinterpreted observations or inconsistencies stemming from qualitative interviews [14]. The most common approach in complementary triangulation is phased methodology. In this regard, researchers can divide the data collection design into two phases: one method for background knowledge and another for in-depth analysis [21]. For example, a quantitative survey can provide data to divide a population into subgroups that can be further analysed in-depth with qualitative interviews. For example, a population can be clustered into groups based on their political party preference through a quantitative questionnaire, and subsequent qualitative interviews can determine the reasons behind their respective choices [18]. Another example of such complementarity is observing a political rivalry, such as in the current Russian-Ukrainian crisis, unfolding a qualitative methodology to complement the process with a quantitative Game Theory model. Under this prism, one needs to firstly put forward the distinction between the two poles of the qualitative/quantitative dichotomy [23] before explaining the basics of quantitative methodology.

Prior to delving deeper into quantitative methodology, it is essential to recognise the practical differences between qualitative and quantitative methods.

Firstly, qualitative research is oftenly linked with inductive logic, moving from the experience of observation to developing a theoretical assumption or hypothesis. This method of research deals with non-numerical data. Secondly, quantitative research is oftenly linked with deductive logic, starting with generating a model or a general hypothesis that is tested through a series of experiments or tests. In contrast with qualitative research, this method requires numerical data.

Following the establishing of such differences, certain examples should prove helpful to explore. It is quite common for a researcher to conduct an investigation of two variables and their possible correlation or as means to verify data in a triangulation method. In quantitative research, the data that are collected can be used in this instance in two distinct ways:

1. Statistical analysis to predict the value of one variable while knowing the other. This occurs when you assume the relation that exists between the variables that are being researched.
2. Formal modelling, by attempting to predict the interactions between those variables while knowing both.

Furthermore, it is useful to delve into the possible ways of having numerical data to analyse. In some studies, original data might be non-numerical, thus should be approached with qualitative method tools. However, there are ways of quantifying apparent qualitative data to conduct a mathematical analysis. Overall, there are three ways to end up handling numerical data [6]:

1. Data gathering: The elements that are being researched are already in mathematical form and the researchers plainly gather numerical data and analyse them.
2. Data coding: This is used when the researchers are handling a large amount of data of a continuous variable. That is, some variables have discrete values, while others have a continuous range of values. The latter requires grouping data to manage them. For instance, analysing economic sanctions and their impact on oil prices in countries involved in a crisis requires establishing groups, e.g. dividing oil prices in 1.950-1.999, 2.000-2.049, 2.050-2.099, etc.
3. Data scaling: IR scholars primarily deal with variables that originally produce qualitative data. Consequently, these are forcibly scaled into quantitative- arithmetic form [26]. A great example would be satisfaction scaling, for which researchers ask participants to grade their level of agreement on a set of statements on a given numerical scale instead of qualitative wording [8].

In IR specifically, quantitative methods supersede the realm of descriptive statistics. Instead of presenting and explaining the results of any research there is an attempt to discover the logic behind the numerical data in order to explain the reasons why something is observed. Furthermore, trying to predict the behaviour of the investigated factors in

similar or other circumstances. According to Hoffmann [12], it is fundamental to understand that quantitative research is the predominant tool in terms of setting theoretical hypotheses in an empirical evaluation. IR scholars have dealt with rational models, applied to assumptions concerning the behaviours of nation-states and have been linked with traditional realism inside the confines of international relations.

Although IR scholars use less quantitative research methods, there are certain advantages for those who decide to combine a method paved with mathematics with a qualitative methodology. Some of these advantages are:

1. Data Clustering, which allows researchers to interpret a large mass of data. Quantitative methods are optimal for anyone who want to use questionnaires and should require a great number of participants. This task is impossible without resorting to data quantification.
2. Specificity, which is a prominent characteristic that statistical methods exhibit by nature through the use of explicit argumentation, leading to assumptions and investigation of the relationships between variables.
3. Transparency, by helping researchers to clarify what is included or excluded from the research. This leads to more straightforward analysis, facilitating the identification of trends that are consistent with the ongoing investigation.
4. Formal language, such as the inference used in mathematics, which enables to establish effective and large chains of arguments. It can help discover existing relationship between variables.

With the use of mathematical tools, it is easier to test hypotheses and assumptions [14, 17, 20]. However, it is difficult to generate new hypotheses due to the complexity of IR. This complexity establishes a multitude of variables and relationships in order to explain even the simplest event in history.

Under this prism, quantitative approaches may be used in qualitative research to effectively organise different sources of data and to create successful argumentation chains. Indeed, the need to triangulate can be met by combining several research methodologies, such as quantitative and qualitative methods [15, 14].

3. Game Theory and Statistical Analysis

In quantitative research, there are two main frameworks that researchers can work with: Game Theory and Statistical Analysis. Although both are explained in this article, Game Theory and its applications are analysed in a more detailed way, while Statistical Analysis is introduced and presented just as a complementary tool to increase the validity of research by data triangulation. It is also important to note also that Statistical Analysis and its applications are more thorough and useful in research using quantitative methods as the sole or primary approach, thus are not included in the present text.

3.1. The Game Theory Framework

Firstly, Game theory framework applies mathematical models to explain and comprehend strategic choices that affect all the participants of a certain situation or, as it is often called, “game”. Since it deals with strategic decisions and possible outcomes of an encounter between participants it is, by nature, important in the study of IR. Game Theory focuses not only on individual decision-making but rather on interactions between individuals that affect their decisions. There are many examples that Game Theory applies to. One characteristic example is the interplay between the United States of America and the Soviet Union during the Cold War. These two superpowers act as the “players” of the “game”, as explained in detail in Tables 1 and Figure 1 below.

Table 1. *The nuclear game between US and Soviet armed forces.*

		United States	
		Retreat	**Attack**
Russia	Retreat	Withdraw Army Withdraw Army	Advantage Handicap
	Attack	Handicap Advantage	Heavy Loses Heavy Loses

The situation between these two countries was that each one could elect to attack or retreat. The possible outcomes were:

Withdraw Army: meaning both avoid losing troops and peace prevails.

Disadvantage: which means the country retreated but was attacked and lost more troops.

Advantage: which means the country attacked without being attacked.

Heavy Loses: meaning both attacked and they both lost many troops.

Each country simultaneously decided if they would attack, so they did not know the decision of the other “player” as they decided. It is obvious that the best choice for the common good was for both armies to decide not to attack. However, out of fear that the other might attack, it is logical for both armies to decide to attack the opponent “just to make sure” they avoid being suckered.

Both attacking is the worst outcome for both. However, the real scenario is seen in Figure 1, as the “game” consists of more than one round. Therefore, after the first decision comes a second, and then a third, etc. The difference between the two tables is that, in Figure 1, each player decides after the other, such as in tic-tac-toe or chess, whereas in Table 1 both players decide together to like in rock-paper-scissors.

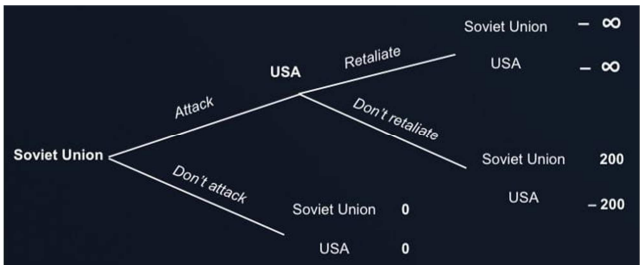

Figure 1. *Game Theory during the Cold War [2].*

It is also important to highlight that the outcome in the "game" is often unpredictable. Abstraction is also a predominant characteristic of the "game", as more "players" can be included, making the result even more volatile and difficult to predict. The European Parliament decision making framework offers a good example of this reality:

Let us assume that the European Parliament [7] votes on a Commission's legislative proposal. Out of the 705 members from 27 countries, a bill needs 353 votes to pass. It is possible for 6 countries (France, Germany, Italy, Spain, Poland and Romania) to vote with a 90-10% split in favour of accepting refugees, reaching a total of 368 votes. This would result in the bill being passed regardless if the remaining members of the other 21 countries all vote against. Therefore, 6 versus 21 resulted in a win for a minority of countries.

The outcome of any vote such as the aforementioned example might be affected by the interactions among Member States. Upon hearing it at first, certain questions may surface. A predominant question might refer to the ways such interactions affect the outcome of a vote. Some Member States might vote based on affiliations and relationships that they have with other Member States. Besides, there is a possibility that some might alter their votes based on the votes of others. Moreover, a certain Member State might vote against a bill that another Member State brought to the European Parliament, as the opposite has previously happened. Therefore, past decisions also affect future ones. Consequently, it is apparent that the complexity of certain situations and the circumstances along with the context that the "game" takes place establishes a somewhat difficult material for research. Attempting to investigate it with qualitative methods and tools is nearly impossible.

Whether there is a game scenario in IR, there are some key notions and game contexts that can be applied in research, as presented below.

3.2. The Prisoner's Dilemma

The prisoner's dilemma is a decision-making and modern game theory conundrum that illustrates how two reasonable persons stuck in the same scenario are likely to respond to it. In this situation, there are 2 players each, with 2 choices and each player's choice affecting the overall outcome. Much like the Cold War example, here the "players" simultaneously decide without knowledge of the other person's decision. This instance refers to two accomplices that are charged with a crime that they allegedly had committed together. The police separate the two and ask them to confess. The possible outcomes appear in Table 2.

Table 2. *Possible outcomes of the Prisoner's Dilemma.*

	Prisoner's Dilemma	
	B denies	**B confesses**
A denies	Each charged with 1 year in prison	A serves 4 years B walks free
A confesses	A walks free B serves 4 years	Each charged with 10 years in prison

The paradox of this instance is that if each chooses the optimal for their personal gain (cooperate with the hope the other defects), then the outcome will be the worst possible for both collectively (10 years prison sentence each). Therefore, there is no correct or optimal answer to this problem, as each player has no knowledge on what the other will choose and has to risk their respective decisions. Nevertheless, although choices are expected to be made based on the assumption of a personal gain, in IR it is common to decide based on the notion that changing tactics cannot increase the individual payoff, as the other "players" would succumb to changing theirs as well.

3.3. Nash Equilibrium

The Nash Equilibrium refers to the state where no individual changes their decisions, and balance prevails. In this case, there is a balance in keeping a collective decision to maintain the optimal overall outcome, although individually people feel the urge to choose the one that can offer the best personal outcome. It is very important to take into account that in IR exists a strategic behaviour through time, as it is not a single "gameplay". The "players" in IR encounter each other multiple times in an iterate "game" of power. Moreover, they are not just two "players", thus the interactions demonstrate increased complexity. Furthermore, the focus of the game theory is non-cooperative games, but in IR there are instances of cooperation among "players" to reach a common good.

In order to fully understand this equilibrium, one can think about red traffic lights. Multiple times, on a daily basis, each individual driver has the choice to abide by the law and wait for the red traffic light to turn green or breach the law and run a red light. Individually, the latter seems the best choice to reach the destination faster. However, if everyone runs a red light, multiple accidents may occur, with drivers taking longer to reach their final destination. Therefore, many times a day drivers choose to comply with traffic rules in order to maintain an equilibrium, otherwise chaos would prevail in choosing the optimal individual decision.

It is apparent that the Game Theory is a very useful tool.

However, all its variations have been used and abused in researching issues of IR. But no other tool has been used more than the classic chicken game, which is considered the ultimate game of power demonstration [27, 19].

3.4. Chicken Game

The original chicken game places two cars facing each other while speeding towards a collision. They start moving towards each other. Each driver is given two choices: either continue moving straight or change direction and try to avoid the collision. There are three possible outcomes of this simple encounter. First, the undesirable outcome of the cars crashing into each other. Second, one of the participants withdraw and swerves the car to avoid the crash. Lastly, both drivers swerve, resulting in a tie. The second outcome offers a winner, while the other two do not. However, the first results in serious injuries.

In most cases of IR, there are more than just two "players" and usually they know what the others will decide. This is called a "sequential chicken", where one's decision forces others to decide accordingly. This alternation of the chicken game, gives each player the opportunity to play the same or opposite to the first player, electing to swerve or to drive straight regardless of what the other player chose.

Another factor related to IR that affects the outcome of such a game is that "players" can swing their choices after debating. Therefore, there are certain elements that affect the process of the "game". For instance, the starting point of the research (there are always prior events that a researcher elects to leave out of the research), which "player" makes the first move, the amount of Nash Equilibria that will form during the "game", and the fact that in most cases "players" elect to take the ethical high road for the greater common good.

The 2022 Russia invasion of Ukraine, for instance, can be studied using qualitative tools and on the basis of a historical research design. The historical representation applies as to interpret the reasons that led the two nations to their current conflict [5], as well as the role of adjoining nations based on their respective relations. However, the Chicken Game can provide the appropriate triangulation data for complementarity reasons. In this case, the Game Theory and its variations presented in this article can be used to set out possible scenarios for the future escalation, or not, of the conflict; and explore the Nash Equilibria by third parties [15, 14].

3.5. Issues of Game Theory Application in IR

> *"Applying game theory to a substantive body of knowledge such as international relations raise a host of difficult empirical questions. For example: Who are the relevant actors? What are the rules of the game? What are the choices available to each actor? What are the payoffs in the game? Is the issue best characterised as single-play or repeated play? In analysing any particular issue, it is impossible to answer all of these questions with certainty." [25].*

Snidal's seminal work reveals the complexity of approaching IR issues from the lens of quantitative research methods. It often seems as if the Game Theory requires a large amount of information, sometimes beyond the realm of possible for a student or even an experienced researcher. While all this information is required, it often lacks the depth to include elements of historical data, behaviours of participants and the rules that exist in diplomatic exchanges. Therefore, its usefulness is questioned as to examining complexed scenarios as the Cold War or the Missile Crisis of 1962. However, the Game Theory is not just a descriptive tool, but rather a tool for analytical predictions and interpretations. One can always add an experiential substance to it to enrich it and reach analytical predictions. The optimal way to achieve that is combining it with qualitative data [22].

Another useful framework for conducting quantitative research in IR is Statistical Analysis. As we so far, the Game Theory seeks to predict behaviour based on mathematical formulae. In turn, Statistical Analysis attempts to predict outcomes on known datasets that are either novel or pre-existing.

IR researchers often use less statistics and mathematics [1]. However, as recent technological developments established computer software and applications for coding, researchers that used to refrain from using anything relating to mathematics seem to reconsider. The most common techniques for generating data are surveys and questionnaires. These are tools that people often think as synonyms for the same process. However, questionnaires are just a list of questions with a single focus of data gathering, while surveys are questions of different purpose, often with different structure that aim to make predictions and observe trends. For the purposes of statistical analysis, a survey is more suitable, while questionnaires are used mostly for information gathering. A sample frame is needed which can be found in similar research projects or special books and can be adapted to fit the variables and needs of the specific research (for further information see [24]). Nevertheless, reaching a representative percentage of a certain population may be a challenge. Finding enough participants so that the sample is representative of the population is also linked to the validity of the data gathered.

In IR, it is very common to use targeted groups instead of random sampling, as it is important to research wanted elements with specific parameters (e.g. age, educational level, workers of a specific institution or organization, etc.). Consequently, random sampling is not desirable as it means that any member of the population has equal chances of getting picked, thus there are no desirable constants in parameters. There are three distinct non-random strategies of finding participants [10]. Opportunistic sampling is taking advantage of personal network, while snowball sampling is building a new network by letting each participant bring others to form their respective networks. These two might demonstrate a selection bias, in which people from the same network might have similar opinions, making the sample not

representative of the entire population. The third non-random strategy is convenience sampling, which is the easiest method for researchers, as participants volunteer to participate. However, this may generate a volunteer bias, in which people that wish to participate may demonstrate different characteristics than the rest of the population [9]. Therefore, it might not be quite representative. Devin [4] and Curini & Franzese [3] have provided a series of guidelines, questionnaire types and a detailed presentation of statistical analysis that provide an essential analytical guide. Moreover, the Annex to this paper outlines the prior knowledge required for such analysis.

4. Conclusion

The combination of various triangulation methods can offer an important validation approach, but also a way to integrate different perspectives into the phenomenon under study, as a way of discovering paradoxes and contradictions, or as a form of further developments/works in the IR field of study. Under this prism, quantitative techniques, such as the Game Theory and Statistical Analysis, are not only significant as separate research methodologies, as well as an important part of qualitative research in IR.

Research in IR can apply triangulation not just as a tool, though also as a way of providing numerical information that is key to observe and interpret complex international realities. However, the debate over qualitative-quantitative research remains strong among researchers in IR. Nonetheless, this issue seems rather a question of synergy rather than rivalry among both.

Appendix: Prior Knowledge Required for Quantitative Analysis

When carrying out triangulation methods and quantitative analysis in general, important rules-of-thumb need to be considered. The following information summarises important considerations for quantitative analysis, which can be applied not only in the field of IR, but in all fields of knowledge.

1. *Variable:* It is a trait, a characteristic, something to be analysed and measured, which changes values from context to context, from case to case, and from time to time. X usually refers to variables. If multiple sets of values for X exist, then we use X_1, X_2, X_3, etc. to refer to each set of values and X_i to refer to all the values in general.
2. *Operations:* The four basic operations are known to all, as well as exponentiation and square root. For any statistical analysis, a calculator that has these features is essential (either a handheld calculator or a computer programme). However, in statistics, the use of the summation $\sum$ operation is very frequent when a formula requires the addition of series of scores instead of individual values. In accordance with the existence of multiple sets of values for variables, we use $\sum x_1$, $\sum x_2$, $\sum x_3$ to add all the values for each set and $\sum x_i$ for adding all the available values for this variable. In addition, the symbol $\sum x_i^2$ is the summation of all squared values, while $(\sum x_i)^2$ is the summation of all values squared.

For example:

$$X_i=5, 6, 8, 10$$

$$\sum x_i=5+6+8+10=29,\ \sum x_i^2=5^2+6^2+8^2+10^2=25+36+64+100=225,\ (\sum x_i)^2=29^2=841.$$

Table 3. *Symbols and Operations [16].*

Symbols	Operations
Σx_i	Add the scores
Σx_i^2	First square the scores and the add the squared scores
$(\Sigma x_i)^2$	First add the scores and the square the total

3. *Negative Numbers:* Another point of interest is the importance of signs in numbers. Signs can be either positive (+) or negative (-). *Confusion or omission thereof can lead to extremely biased results.* The rule for adding or subtracting numbers is that the result has the sign of the greater number and if they have the same sign, values are added. In case they have different signs, factors are subtracted.

For example, in -4+3, it is observed that the larger number is 4, thus the result will be negative (as 4 is a negative number). In addition, these two numbers have opposite signs, thus they are subtracted, i.e. 4-3=1. Consequently, -4+3= -1.

As for multiplication and division, the basic rules are that negative always prevails, though two negatives make a positive.

For example, -3 * +2 = -6 (3 is negative and always prevails, that is why the product is negative)

$\frac{-8}{-2}$= +4 (two negatives make a positive)

Note that: **Fractions are divisions*
**Negative numbers do not have roots*

4. *Point and Comma:* It is important to consider that in different parts of the world the symbols of "." and "," are used contrarily. This means that it is essential to familiarise with each data set and observe which is which in any given situation.

For example, in the UK and across the Commonwealth, the number 13.500kg means thirteen kilos and five hundred grams, while 13,500kg means thirteen thousand and five hundred kilos.

On the other hand, in most countries the number 13.500kg means thirteen thousand and five hundred kilos, while

13,500kg means thirteen kilos and five hundred grams.

5. *Accuracy and Rounding off:* Results often have many decimal digits (especially in square roots) and in order to continue there is a need of rounding off. This may lead to different results among researchers with the same data sets. It is important to know when and how to round off. One good rule is rounding off the result of the last operation keeping to the two closest decimal digits. If an intermediate result is needed before the last operation, then it is a good idea to apply the two-decimals rule there as well. Rounding off means looking at the next of the last digit that you intend to keep and apply the following rule:

If the number is 0, 1, 2, 3, 4 then just delete it as if it does not exist. If the number is 5, 6, 7, 8, 9 then delete it again *but* raise the last digit by 1.

For example, if we wanted to round off 23,368329, we would want two decimal digits, so we observe the third decimal which is 8. It is over 4, so we round up. This means deleting 8329 and adding one to the last digit we keep, which is 6, making it 7. Therefore, 23,368329 rounds up to 23,37.

Another example is rounding off 156.789,05341. Once again, we tend to keep two decimal digits, so we observe the third decimal digit which is 3. It is under 4, so we round down the number and just delete the digits we don't want, meaning 341. Therefore, 156.789,05341 rounds down to 156.789,05.

6. *Precedence of Mathematical Operations:* A mathematical formula might contain multiple operations, so the current order is essential.

For example: $13+5*2^3$. If we use different orders, we have the following results:

$$13+5*8=13+40=53.$$

$$13+10^3=13+1000=1013.$$

$$18*2^3=18*8=144.$$

The importance of precedence of mathematical operations is essential. The order is as follows:

1) Parentheses
2) Powers and Square Roots
3) Multiplications and divisions
4) Additions and Subtractions

7. *Percentages:* Percentages is nothing more than fractions with a denominator equal to 100. Percentages are useful analogies to make comparisons between unequal situations. They can take the form of fractions, decimal numbers or%. For example, 50%=50/100=0,5. It is important to remember that a percentage of 100% or 1 is something as a whole, the entirety of something. In order to calculate the percentage of any amount just use multiplication.

For example: 5% of 12.000 is $12000*\frac{5}{100}$=600. So, 600 is the 5% of 12000.

In order to translate a percentage into decimal or a decimal into a percentage, just multiply or divide with 100.

For example, 30%= 30:100=0,3 and 0,75=0.75*100%=75%.

If the percentage needs to be measured, then the proportion of what is measured needs to be formed in a fraction. The nominator is the amount to be measured and the denominator is the total amount.

For example, in a national parliament consisting of 40 MPs 15 out of whom voted in favour of abolishing abortion, 22 opposing it and 3 elected not to vote.

Translating this proportion into a percentage is $\frac{15}{40}$=0,375=37,5% of MPs voted in favour.

$\frac{22}{40}$=0,55=55% of MPs voted against. $\frac{3}{40}$=0,075=7,5% elected not to vote.

If the overall is not 100% then there is a mistake. 37,5%+55%+7,5%=100%, which is correct.

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