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Vivekanand College , Kolhapur(Autonomous)

Affilated to

Shivaji University , Kolhapur

For the Degree of Bachelor of Science

In Mathematics

By

Mr. VAIBHAV MAHENDRA THANEKAR.

Roll No :- 7900

Exam Seat No :-

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B.Sc III(Mathematics) Year:2021-22

Project Name

"MATHEMATICS IN WORLD"

Under the Guidance of

Mr. Patankar S.P (H.O.D) Department of Mathematics)

Mr. Thorat S.P (Department of Mathematics)

"Education for Knowledge, Culture and Science"
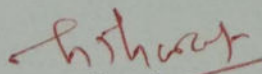
... Shikshanmaharshi Dr. Bapuji Salunkhe.

Shri. Swami Vivekanand Shikshan Sanstha , kolhapur's

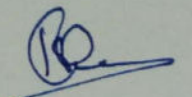## VIVEKANAND COLLEGE (AUTONOMOUS), KOLHAPUR

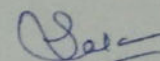## DEPARTMENT OF MATHEMATICS

CERTIFICATE

This is to certify that **Mr. VAIBHAV MAHENDRA THANEKAR.** has successfully completed the project work on topic **"MATHEM- -ATICS IN WORLD"** towards the partial fulfilment for the course of Bachelor of Science (Mathematics) work of Vivekanand College (Autonomous) Kolhapur affilited to Shivaji University, Kolhapur during the academic year 2021-2022 .This report represents the bonafide work of student.

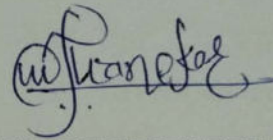Place :- Kolhapur

Date : 28 / 05 / 2022

Teacher Incharge

Examiner

Head of Department
HEAD
Department of Mathematics
Vivekanand College, Kolhapur

DECLERATION

I undersigned hereby declare that project entitled
"MATHEMATICS IN WORLD". Completed under the
guidance of Mr. S.P. Patankar sir and Mr. S. P. Thorat sir (Department
of Mathematics, Vivekanand College Kolhapur). Based on the experiment
results and cited data . I declare that this is my original work which is
submitted to , Vivekanand College Kolhapur in this academic year.

Mr. VAIBHAV MAHENDRA THANEKAR.

28·05·2022

ACKNOWLEDGEMENT

On the day of completion of this project , the numerous memories agreeing rushed in my mind with full of gratitude to this encouraged and helped me a lot at various stages of this work.

I offer sincere gratitude to all of them . I have great pleasure to express my deep sense of indebtedness and heart of full gratitude to my project guide Mr. S.P. Patankar sir . For his expert and valuable guidance and continuous encouragement given to me during the course of project work.

I am thankful to prin. Dr. R.R.Kumbhar sir (Principal, Vivekanand College) and Mr. S.P. Patankar sir (H.O.D Dept. of Mathematics) for allowing me to carry out our project work and extending me all the possible infra-structural facilities of department.
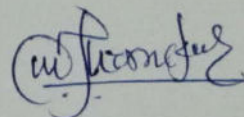
I would like to thank all my teachers Mr. S.P.Thorat sir , Mr. G.B. Kolhe sir and Miss. S.M. Malavi mam for co-operation, help and maintaining cheerful environment during my project.

I would also like to thanks non-teaching staff Mr. Birnale.

I would like to thanks my entire dear friends for their constant encouragement and co-operation .I am indebted to my parents who shaped me to this status with their blunt less vision and selfness agenda.

Place :- Kolhapur

Date :- 28/05/2022

MR. VAIBHAV MAHENDRA THANEKAR.

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INTRODUCTION

"MATHEMATICS GIVES US HOPE THAT EVERY PROBLEM HAS A SOLUTION"

What is Mathematics? Is the world really complete without mathematics?

Mathematics is study of measurement, numbers and space which is one of the first science that humans work to develop because of its importance and great benefit.

Mathematics is the branch of science which deals with number and their operations.it involves many branches of mathematics. Mathematics is reveals hidden pattern that to understand the world the world around us.

Mathematics plays a vital role in all ascept of life whether everyday matter such as, driving, tracking, cooking, finance, engineering, software as well as in space, economics, voting, medical field, movie graph etc.

These functions require a strong mathematical background and scientific experiments by scientists need mathematical techniques. They are a language to describe scientists work and achivement.

MATHEMATICS IN WORLD

Understanding the World Through

Mathematics

The body of knowledge and practice known as, Mathematics is derived from the contribution of thinkers throughout the ages and across the globe. It gives us way to understand patterns to quantify relationships and to predict the future. Math help us understand the world and we use the world to understand Math.

The world is interconnected. Every day math shows these connection and possibilities. The earlier young learner can put these skin to practice, the more likely we will remain an innovation society and economy.

"Mathematics is great motivation for people as it life start with ZERO but never ends INFINITY."

For students to function in global context math content needs to help them get to global competence, which is understanding different perspectives and world conditions, recognizing that issues are interconnected across the globe, as well as communicating and acting in appropriate ways. In math, this means reconsidering the typical content in typical way and

showing students how the world consist of situations, events and phenomena that can be sorted out using the right math tool.

Math is often studied as a pure science, but is typically applied to other disciplines. Extending well beyond physics and engineering. For instance, studying exponential growth and decay. Within the context of population growth, the spread of disease, or water contamination is meaningful. It not only gives students a real world context in which to use to math but help understand global phenomena.

A study of statastics and probability is key to understanding many of the event of the world and is usually reserved for students at a higher level of math, if it gets any study in high school at all but many world events and phenomena are unpredictable and can only be described using statistical model so a globally focused math program needs to consider including statistics. Probability and statistics can be used to estimate death tolls from natural disasters, such as earthquakes and tsunamis, the amount of aid that might be necessary to help in the aftermath and the no. people who would be displaced.

More importantly, students will be able to use data to draw defensible conclusions and use mathematical knowledge and skill to make real life impact.

At the heart of any discussion on global curriculum through math, it is important to consider how the math helps student make sense of the world, what in student's experience enables them to use the math to make contribution to the global

community, and what math content students need to solve problem in a complex world.

Then the challenge is finding genuine relevant and significant examples of global or cultural contexts that enhance, deepen and illustrate and understanding of math.

Therefore, Mathematics is used in many different fields in world. We are study the some application of mathematics in different fields.

> GPS Navigation
> Economics
> Health care
> Building bridges
> Insurance
> Movie graph

❖GPS NAVIGATION

➤ The Mathematical methods used in GPS navigation are also used in weather prediction, seismology (earthquake studies) and oceanic and atmospheric modeling.

➤ A GPS unit uses a mathematical model to calculate the position of moving vehicle, based upon previous measurements of its position However, these measurements are inaccurate, due to factors. Such as: atmospheric conditions that interfere with instrument readings, and noise in the wireless signals. In addition the mathematical model used to find the car's position, given its velocity, is also inaccurate and incomplete; for example, it does not take into account wind speed. Therefore, all the unit can do is find a good estimate of the position of the vehicle.
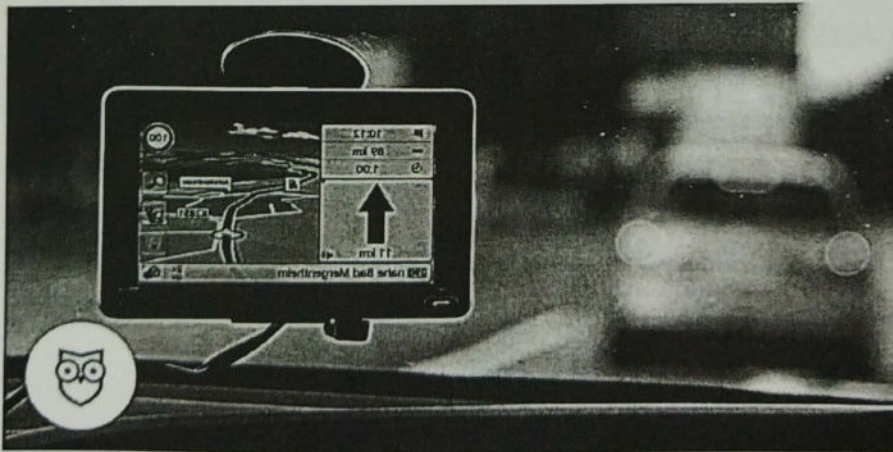
➤ There are many different estimates that could be calculated, but it is desirable to find the "best" estimate, given the measurement and model. The "best" estimate

is often defined as the least squares estimate, which minimizes the error(distances) between the calculated estimates and the original measurements.

➢ The more measurements that are collected and used, the least squares estimate becomes. However, as additional data is added to the calculation of the estimate, the calculation and storage become unwieldy, resulting in a and the unit that cannot produce an estimate quickly enough to be of any use.

➢ This reduces the computational time significantly, allowing GPS systems to operate close enough to real time to be useful to the vehicle operator.

➢ Use of least squares method on a dynamical system dates back to Gauss, who used it to estimate the orbit of planet ceres. Gauss first began to work on this problem in 1795, when very few measurements of the orbit were available instruments used to make those measurements were highly inaccurate. However, his method still managed to produce results that were accurate enough for astronomers to locate ceres a year later in the area he had predicted.

❖ ECONOMICS

What is mathematical Economics?

Mathematical Economics refer to an economic model that uses the principles and method mathematics to create economics theories and analysis economic dilemmas. Mathematics helps economists to perform quantifiable experiment and create models for predicting future economic growth.
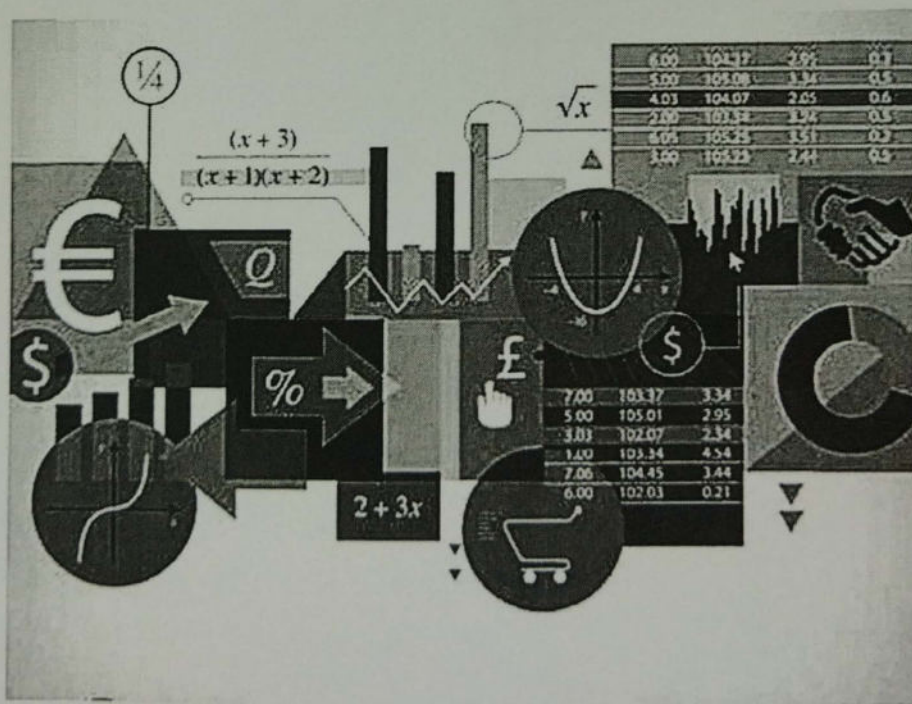
Advances in computing power, large-data techniques and other advanced mathematical technologies have played a major role in making quantitative methods a fundamental aspect of economics. All of these element are supported by scientific methods which advance the study of economics.

The synthetics of statistical methods, mathematics and economic principles have created a whole new branches of econometrics. The mathematical economy is a specialization within the econometrics branch.

Understanding Mathematical Economics

In order to prove, disprove, or forecast economic behavior, mathematical economics depends on statistical observations. Even though the researcher's bias heavily influences the discipline of economics, mathematics enables economic to describe an observable phenomenon and offers the backbone for theoretical interpretation.
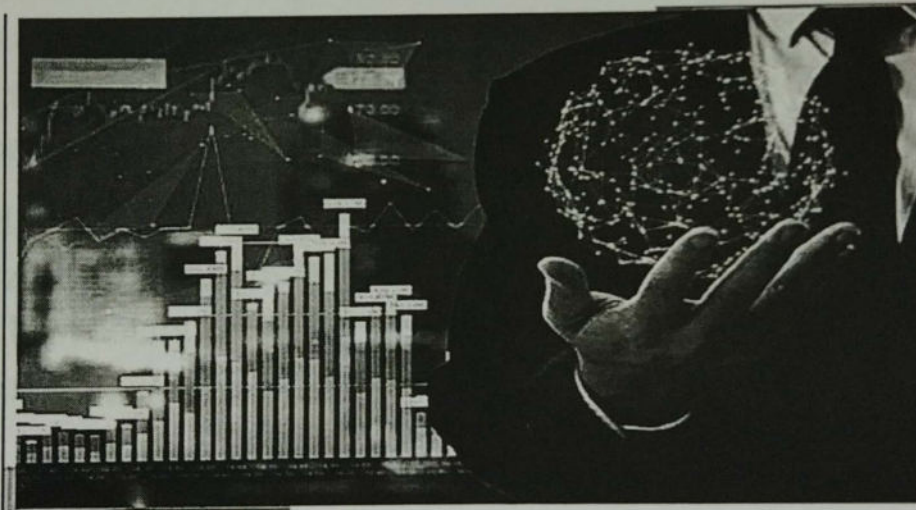
There was a period when economics relied heavily on anecdotal evidence or situational theories to try and make economic phenomena significant. At that time, mathematical economics was a starting point in the sense that it introduced formulae for qualifying economic changes. This has gushed out into economics as a whole and most economic theories now contain some kind of statistical evidence.

Impact Of Mathematical Economics

Mathematical economics paved the way for genuine economic modelling. Through the inclusion of mathematics, theoretical economic models have become useful instruments for day-to-day economic policymaking.

Econometrics as a whole has the goal of translating qualitative statements (such as "the relationship between two or more variables is positive") into quantitative statements (such as "consumption spending rises by 95 cents for each dollar increase in disposable income").

Mathematical econometrics is especially useful in resolving optimization problems where, for example, a policymaker looks for the best change out of a variety of changes to affect a particular outcome.

❖ HEALTHCARE

You may be wondering why nursing and medical students need to study mathematics as a part of their course. We thought that nurses, physicians and other health care professionals must only study clinical procedures, treatments, medicines, anatomy and physiology. But the truth is math is incorporated into the daily lives of the health care professionals. Doctors and nurses use math when they write prescription or administer medications. Medical Professionals use math when drawing up statistical graphs of epidemics or success rates of treatments.
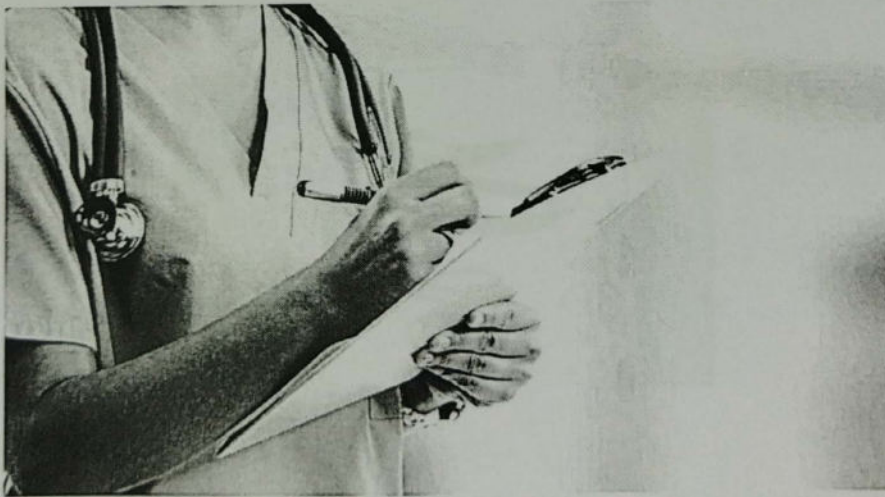
We are aware that doctors write prescriptions for their patients for various sicknesses. These prescriptions show a particular medications and dosage amount. Usually, medicines

have recommendations for dosage amounts in mg (mg) per kilogram (kg). Doctors need to determine the number of mg of medicine each patient will require, based on how much the weight. When the weight of patient is just known in pounds, doctors have to convert that measurement to kilos and then compute the amount in m for hat prescription. There's really large distinction between mg/kg and mg/pounds, so it's imperative that doctors learn how to precisely convert.

Doctors should also figure out how a prescription can last. They must be able to determine how long the medication will stay in the patient's body. This is important, because through this, the patient will be aware about the interval of the medication. This can figure out how frequently the individual must take their medication to be able to keep an adequate amount of the medication in the body.


Mathematics plays a vital role in medicine. Since people's lives are involved, it is crucial that nurses and doctors be really accurate with their mathematical calculations. Numbers will give information to doctors, nurses, as well as patients. Numbers are

very essential within the medical area. Math is a crucial player within the healthcare arena. Medical companies must obtain reliable data and information to avoid, identify and treat medical conditions. Mastery of the tools of health care as well as scientific calculations will provide an efficient and lucrative delivery of services and reduces the chance of medical mistakes that may lead to malpractices and tragedies. The existence of mathematics in the medical theory will assure everyone that our doctors and nurses are properly trained and accurate with their prescription and medication.

❖ BRIDGES & CONSTRUCTION

Bridges are very essential for people and their travels. Without them, we would not be able to travel across water more efficiently. Many bridges have multiple shapes, and graphs. The road itself is a line, or some roads are in the shape of a parabola. Typically, bridges also have a parabola above it, as shown in the picture. In the picture, the parabola is made of small triangles. The engineers that design the bridges, use a lot of math in order to find the dimensions and to make them.
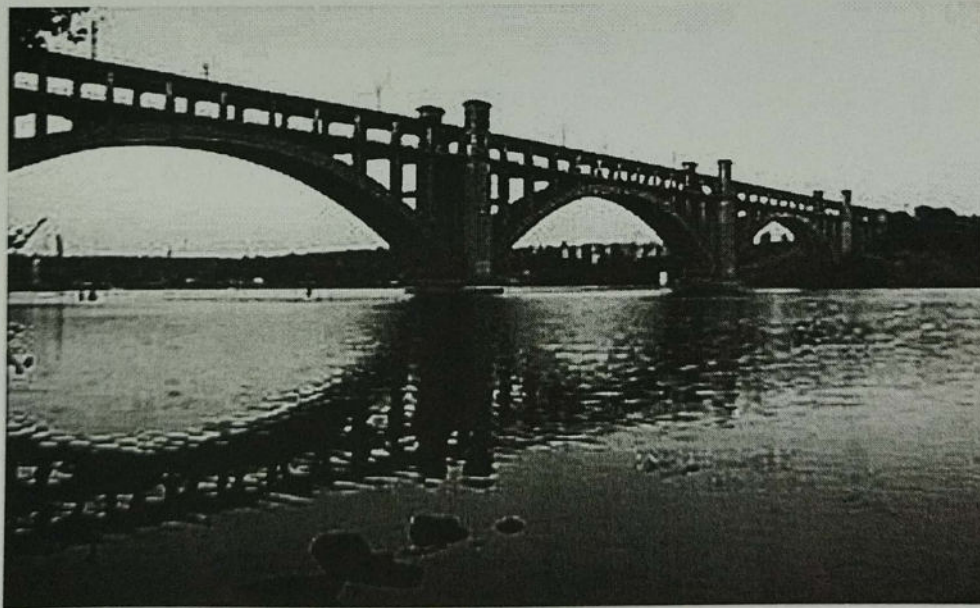
In order to find the road length, you have to find the distance between the starting and end point. In order to build the parabola, there has to be an equation first. The equation that would be used is $ax2 + bx + c = 0$. This equation is used to find what the parabola would look like.

In order to find how big the triangles are, you have to use a formula as well. Well, many formulas. Due to the fact that a triangle is a triangle, trig is involved. The Pythagoras theorem, sine, cosine, and tangent is used. They are used to find the length of the triangle sides, and the angles of each triangle.
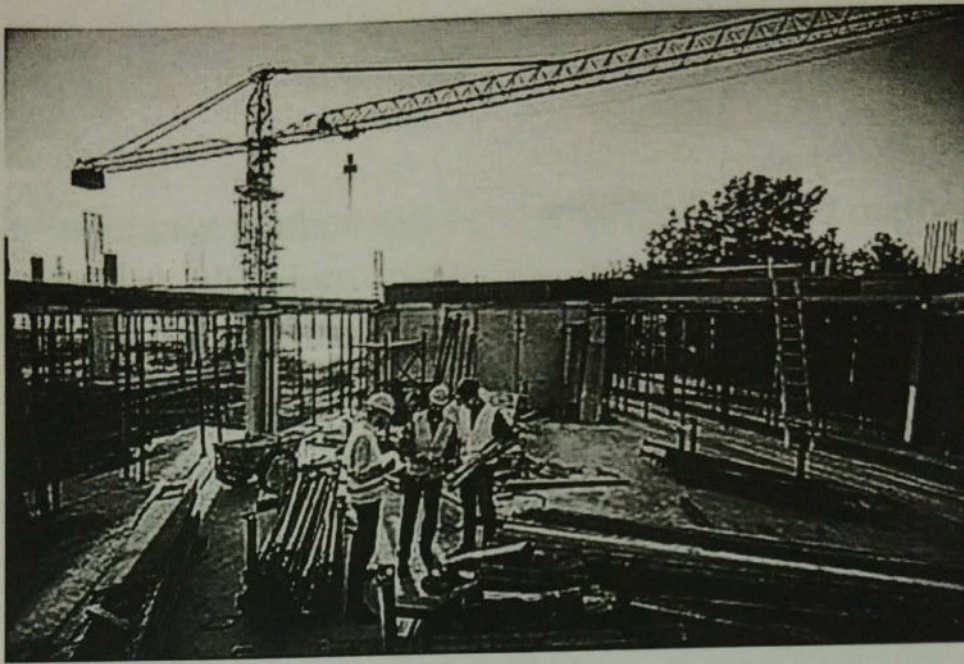
Constructions takes the mathematical description of the word construction, exploring mathematical constructions and scale diagrams in different contexts; skills which are vital when working with plans. The resource also stresses the importance of accuracy in calculations. This is a good lead in to the resource Architect's Skills in which students have to describe 3D models in two dimensions and decode plans. Mathematics from Outdoors and Outdoor Trigonometry continue the theme exploring more complex mathematical topics such as Pythagoras' theorem, trigonometry and circles. Building a Town and Building Silos are practical based activities in which students realize a three dimensional structure based upon two dimensional planning.

❖ INSURANCE

Insurance mathematics is the area of applied mathematics that studies different risks to individuals, property and businesses, and ways to manage these risks. Insurance mathematics relies heavily on calculus, probability, statistics and interest **theory**. These disciplines are used in insurance to interpret data from past events, and to model future events. Some applications of insurance mathematics are pricing insurance policies, determining **cash reserves** to cover claims incurred, and modeling capital asset allocation scenarios.
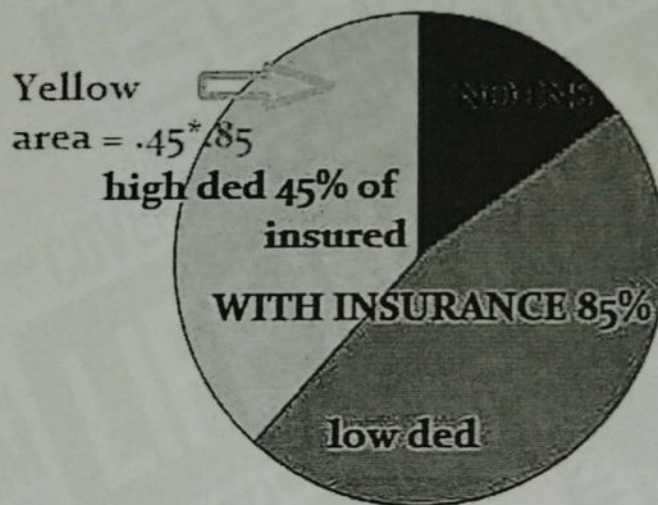
Insurance mathematics is one of the many tools used in **actuarial science** to **assess risk**. By definition, a risk is the possibility of the occurrence of a hazard. Individuals are exposed to risks such as sickness, disability and death. Property could be

stolen, destroyed in a fire or by a flood. Businesses could be interrupted by natural disasters or suffer losses from lawsuits.

Insurance mathematics is used to better define and manage these risks. **Life insurance** protects individuals and other insurance protects property and businesses, reducing the financial impact of unforeseen events. Risk theory is used to define the likelihood that a hazard will actually occur, and to measure the financial impact of the hazard.

Insurance mathematics draws upon many sub fields of mathematics. Calculus is the foundation of most insurance mathematics. Probability is another fundamental subject when defining the uncertainty of hazards. Statistics is important in order

to study past events.   Interest theory and other financial mathematical topics are important when defining the **present value** of future payments.

Once insurance mathematics has been used to model future events, this model can be applied to the insurance business. The expected number and severity of claims can be used to price insurance policies. The model can also be used to determine how much cash will be necessary to cover future claims and expenses. Models are used to analyze corporate financing scenarios which often contain derivatives, in order to hedge different types of asset risk. Using theory or simulation, different investment strategies are studied, requiring an intimate knowledge of financial mathematics.

❖ MOVIE GRAPH

Everyone likes going to the movies, however most people don't normally associate mathematics with film making, apart from in stories such as Good Will Hunting or a Beautiful Mind. In fact, the real starring role of mathematics is behind the scenes, as most modern movies couldn't be made at all without the use of mathematics

Maths is used to create many of the special effects that modern films rely on so much. As an example, the Lord of the Rings trilogy used 263 special effects artists, all of whom used a vast amount of maths to do their work.

"THE REAL STARRING ROLE OF MATHEMATICS IS BEHIND THE SCENES, AS MOST MODERN MOVIES COULDN'T BE MADE AT ALL WITHOUT THE USE OF MATHEMATICS."

- Making the image
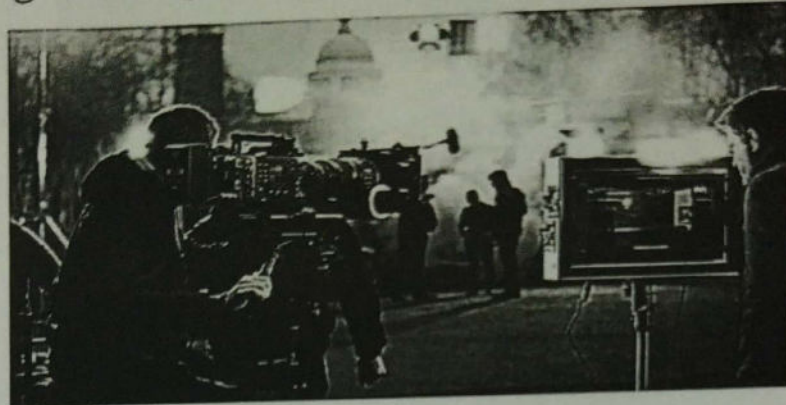
A character such as Shrek is described mathematically as a collection of points, curves and surfaces, stored inside a computer. These points are moved around to give the impression of a living and breathing ogre, interacting with its environment. To create the image it is common to build a model of the character. The model is then scanned with a laser, and the coordinates of the points on its surface are stored in the computer. To do this, the points are joined up using mathematics to form wire skeletons, which are made up from simple polygons such as triangles.

- Rendering and Subdivision

Whilst triangles are very useful to define the shape of the object, they do not give images which look as realistic as we might like to. produce more realistic images a second process is used to give a smoother picture. The most widely used tools in recent film production are subdivision algorithms, which are used iteratively to add more points to an image to give a smoother looking picture.

- Lighting it Up
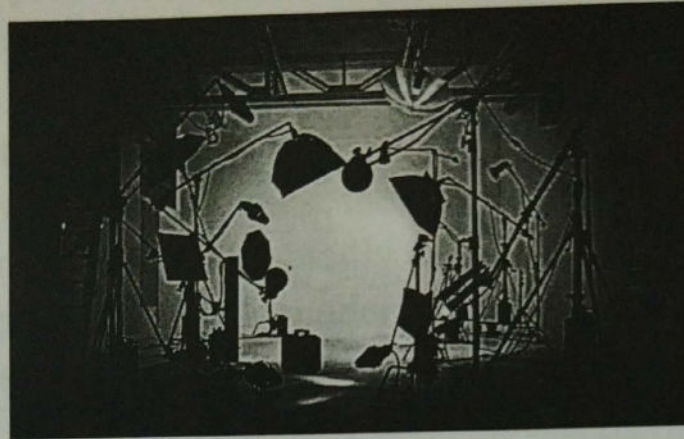
We see images by the light which is reflected from them. Different surfaces reflect light in different ways, and light from these objects can reach our eyes from many different directions.

The usual method used to do rendering is called ray tracing, in which a very large number of computer generated light rays are artificially shone onto the object. The light rays are assumed to be straight lines, which reflect off the object in different ways depending upon its orientation and material. The process of ray tracing starts by identifying the viewpoint of the supposed moviegoer. Starting from this point, rays are traced backwards towards the object and reflected off it with different strengths depending upon the nature of material .

- The Future

The head of research at Pixar was recently asked: 'What advice would you give someone who wanted to use math to make movies?' His response was: 'Learn as much mathematics as you can, particularly applied math. The areas of mathematics

we use most heavily today are Euclidean and affine geometry, trigonometry, linear algebra, calculus and numerical analysis. We don't really know what the mathematical tools of tomorrow might be, so we're counting on the next generation of employees to tell us.

This quote underlines the fact that the mathematics behind the movies is undoubtedly one of the most dynamic and growing applications of modern mathematics, with many exciting possibilities for the future.

CONCLUSION

Mathematics are very important in our daily life as well as our whole world. So we have to learn them as possible to understand the world where we live. Mathematics may not teach us how to add love or minus hate. But to hope that every problem has a solution.

- Use of mathematics to model situations or events in the world.
- Mathematical knowledge plays a crucial role in understanding the contents of other such as science, social studies, and even music and art.
- Mathematics help the man to give exact interpretation to his ideas and conclusion.it is numerical and calculation part of man's life and knowledge.
- It plays a predominate role in our everyday life and it has become an indispensable factor for the progress of our present day world.

REFERENCE

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