



MATHS IN CONTEXT OR WHEN WILL I EVER USE THIS?

Introduction – Very few students sign up for a vocational college course with the view to doing maths alongside it. One of the first questions we ask is, “Why do you think you didn’t get a grade 4 in school?”

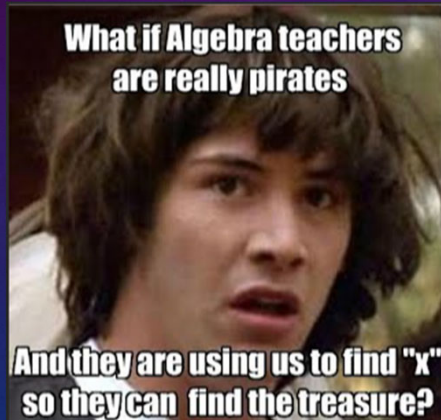
STATE A REASON WHY F.E. RESIT MATHS STUDENTS
CLAIM THEY DID NOT GAIN A GRADE 4 AT SCHOOL

Wait for examples - These barriers, for the majority, prevent students from being motivated at week 1 of college and we have to do our best to embed it throughout all of our courses so they can rethink the relevance of maths.

WHAT IS THE MOST COMMON QUESTION MATHS
TUTORS GET ASKED BY RESIT STUDENTS?

One way we do this is to answer their questions regarding the relevance of specific maths topics. (ask the question) Write responses on the board.

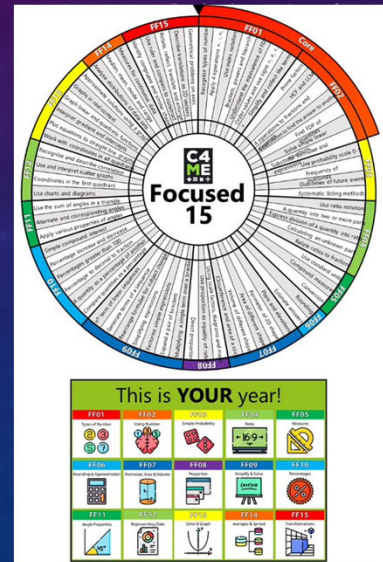
WHEN WILL I EVER USE ALGEBRA???????



The question we get asked the most is always surrounding algebra. Most students accept area, perimeter, volume and ratio play a part in their course and in their everyday lives but very few accept algebra is relevant to them, their course or their lives and they are most reluctant to attempt this topic.

COLLABORATIVE APPROACH TO MATHS

FOCUSED 15



Algebra forms part of the scaffolding in our maths curriculum and helps students to make the step from a grade 3 to a grade 4. We use the focused 15 as our scheme of work and this can be seen in almost every maths classroom across the partnership. You will be able to identify the maths skills the students use in your courses and having a collaborative approach helps to reinforce the relevance of maths in their chosen area which will have a positive impact on the relevance of their maths lessons.

WHERE DO YOU USE ALGEBRA IN YOUR CURRICULUM AREA?

What I would like you to do is identify where algebra appears in your curriculum area. Discuss results from areas and collect all responses at the end of the session so they can be added to the following slides and sent to areas.

ANIMAL CARE

- **Animal Care - Algebra** is used in animal care to calculate dosages of medication, measure food and water intake, and analyse data for research purposes.
- **Veterinary Technician** A veterinary technician uses algebra when calculating the amount of medication required for a particular animal based on their weight and condition.
- **Veterinarian** A veterinarian uses algebra to calculate the correct dosage of medication for a particular animal based on its weight and medical condition
- Calculating a horse's daily feeding requirements based on their weight and nutritional needs.
- Measuring the dosage of medication for a sick or injured animal based on its weight and the recommended dosage per pound.
- Determining the amount of medication or supplements required for a specific number of animals in a herd or flock.
- Calculating the cost of feed, bedding, and other supplies needed for animal care based on the number of animals and their daily needs.
- Measuring the size of enclosures or pastures to ensure that they provide enough space for the number of animals that will live there.
- Calculating the cost of fencing or other necessary structures to secure animal enclosures.
- Estimating the amount of veterinary care expenses for a year based on previous bills and current trends.
- Calculating the ideal breeding time for animals based on their reproductive cycle.
- Measuring the amount of water or medicine required for a specific animal in terms of millilitres or fluid ounces.
- Estimating the length of time it will take for an animal to recover from an illness or injury based on past experiences or records.

ART, DESIGN AND FASHION

- Fashion Design - Algebra can be used in fashion design to calculate patterns, measurements, and ratios. It can help designers to create and adjust designs accurately and precisely.
- Fashion Designer - A fashion designer uses algebra to calculate the correct pattern measurements dynamically, adjust it to fit different sizes while ensuring that it keeps the same proportion.
- Art and Design - Algebra is used in the arts to calculate measurements and proportions for sculptures and paintings. It can also be used in music to calculate the correct pitch and frequency for sound waves.
- Artist - An artist may use algebra to calculate the correct proportions when drawing or sculpting a person's face or figure.
- Fractal Art: Fractal geometry, a branch of algebra, is often used in creating stunning fractal art. These images are created using mathematical formulas that are iteratively applied to create complex and intricate patterns.
- Pattern Design: Algebraic expressions and equations help to create geometric patterns in design that are used in textiles, graphics, and architecture. The repetition of lines and shapes creates stunning visual effects which can be seen in a wide range of products.
- Colour Theory: The use of colours in design involves complex algebraic theories related to colour spaces, colour models, and colour mixing. The colour wheel, for instance, is a mathematical tool used in creating balanced colour schemes.
- 3D Models: The creation of 3D models in fashion and product design involves algebraic concepts such as matrices, coordinates, and equations. This helps designers create realistic virtual models that can be rendered from multiple angles.
- Symmetry and Proportions: The use of mathematical ratios and proportions in design is an algebraic concept that creates visual harmony. This can be seen in the use of geometric shapes in architecture or the steps used to create designs in fashion like pleating and draping.

BUSINESS

- **Business** Algebra is used in business for data analysis, accounting, and finance.
- **Business Analyst** A business analyst uses algebra to financial evaluations like ratio analysis, compare financial figures and its organization, which compares the current year's financial statements and the past year's financial statements to assess how well the company is performing.
- **Profit and loss calculations:** Businesses use algebra to calculate their profits and losses. An equation like $\text{revenue} - \text{costs} = \text{profit}$ can be used to understand how much profit a company is making based on its revenue and expenses.
- **Trend analysis:** With the help of algebra, businesses can analyse trends in their sales or expenses over time. They can create equations to analyse the data and forecast future levels of activity.
- **Inventory management:** Algebra can be used to optimize inventory levels and minimize waste. A company can create an equation to determine the optimal reorder point for a particular product to ensure that they maintain adequate stock levels and minimize overstocking.
- **Pricing strategies:** Algebra can help businesses determine pricing strategies. By analysing consumer demand, costs, and market competition, companies can create equations to determine the optimal price point for their products or services.
- **Marketing campaigns:** Businesses can use algebra to analyse the effectiveness of their marketing campaigns. They can create equations to understand how much revenue a particular campaign generates and adjust their marketing budget accordingly.
- **Financial forecasting:** Algebra can help businesses in financial forecasting, which involves making estimates of the future income and expenses. By creating equations based on historical data and market trends, companies can forecast their future revenue, profits, and operating costs.

CONSTRUCTION

- **Bricklayer** - A bricklayer uses algebra to calculate the number of bricks required for a wall and adjust the size of the wall according to the available space.
- **Carpenter** - A carpenter uses algebra to calculate the correct angle needed for a corner joint, ensuring the structure is secure and stable. They also use algebra to calculate the number of wooden planks needed for a project, the right length, and how to cut them to minimize waste.
- **Painters and Decorators** - Algebra can be used in painting and decorating to calculate the area of a room and the amount of paint required.
- **Painter and Decorator** - A painter and decorator uses algebra to calculate the area of the room being painted and how much paint they will need to complete the job.
- **Estimating Materials & Costs**: Algebra is used to calculate the amount of materials needed for a construction project, as well as the associated costs. This includes determining how much concrete, lumber, or metal is needed, and the associated expenses for each.
- **Project Management**: Algebra is used to plan and manage construction projects, including scheduling tasks and allocating resources. This may involve calculating the critical path, determining the duration of each task, and optimizing the project timeline to minimize delays and maximize efficiency.
- **Material Strength & Durability**: Algebra is used to determine the strength and durability of construction materials, such as concrete and steel. This involves calculating the maximum stress that a material can withstand before breaking, and determining the appropriate safety factors to use in design and construction.

DIGITAL AND CREATIVE INDUSTRIES

- **Digital Media** Algebra is used in digital media to create special effects, manipulate images and audio, and design graphics. Animators and video game designers use algebra to manipulate lighting and camera angles.
- **Video Game Designer** - A video game designer uses algebra to compute the speed, trajectory, and position of a character's movement in the game while avoiding obstacles.
- **Digital Sound Processing** Sound engineers use algebra to manipulate soundwaves digitally. They use mathematical formulas like Fourier series, Laplace transforms, and Z transforms to make digital signal processing algorithms.
- **Computer Graphics** In digital media, algebra is used to represent complex shapes and objects on the computer screen. Graphic designers use algebraic formulas to create 3D models, modify images, and simulate light and shadows.
- **Video Editing** Algebra is used in video editing to change the brightness, contrast, saturation, and hue of the footage. Video editors use mathematical formulas like the RGB (Red Green Blue) colour model and contrast functions to apply colour grading and filter effects.
- **Game Development** Algebra is essential in game development, from designing gameplay mechanics to creating realistic physics simulations. Game developers use algebra to calculate and predict the trajectories of bullets, projectiles, and characters.
- **Data Analysis** In creative industries, data analysis is critical for making informed decisions and understanding consumer behaviour. Marketing experts, web analysts, and social media managers use algebraic formulas like regression analysis, correlation, and standard deviation to analyse data and make predictions.

EDUCATION

- **Evaluating Student Progress:** A teacher may use algebraic concepts to track the progress of students in various subjects. For example, if a teacher notices a consistent pattern of low test scores in an algebra based physics class, they may use algebra to analyse different variables, such as the amount of time spent studying versus the number of practice problems completed.
- **Classroom Management:** Algebraic concepts, such as variables and equations, can be used to develop rules or procedures for managing student behaviour in the classroom. For example, a teacher may use an equation to develop a seating chart that ensures high performing students are seated next to struggling students.
- **Budgeting:** A non math teacher can use algebraic concepts, such as budgeting and financial management, to justify teacher supply purchases or to create project plans. A teacher may also use algebra to calculate school district budgets or to determine which extracurricular activities will receive funding.
- **Data Analysis:** A teacher may use algebra to interpret and analyse student data using statistical formulas. For example, this could involve analysing data from standardized tests, student surveys, or other sources and using algebra to highlight the most important data trends.
- **Problem Based Learning:** Algebra based problem solving can be used to enhance student learning and foster critical thinking skills. A teacher may design a less on plan around a real world challenge that requires students to use algebraic thinking to solve a problem, such as determining how much to charge for a school fundraiser item or how to reduce cafeteria waste.

ELECTRICAL AND PLUMBING

- Electricians:
 - Ohm's Law: An electrician may use algebra when calculating the resistance, current or voltage in a circuit, using Ohm's law which states $V = IR$.
 - Electrical power: An electrician may use algebra when calculating electrical power in a circuit using the formula $P = VI$ or $P = I^2R$.
 - Wiring calculations: Electricians use algebra when calculating the load on a circuit, which is affected by the number and type of devices connected and the length and size of the wire, to determine the appropriate wire size and circuit breaker.
- Plumbers:
 - Fluid Mechanics: Plumbers may use algebra to calculate pipe sizing, flow rate and pressure drop in a system using fluid mechanics formulas.
 - Pipe fittings: Plumbers may use algebra when calculating the slope required for drainage pipes, which depends on the diameter of the pipe and the distance between the start and end points.
 - Heat loss calculations: Plumbers may use algebra when calculating the heat loss from pipes and fittings, which depends on the temperature difference between the inside and outside of the pipe and the thermal conductivity of the material.

ENGINEERING

- **Engineering** Algebra is used in engineering to design and develop solutions to problems and analyse data. - It's also used in spatial reasoning for mapping and surveying.
- **Aerospace Engineer** - An aerospace engineer uses algebra when calculating the trajectory and velocity of a satellite when launching it into space.
- **Civil Engineer** A civil engineer uses algebra to calculate the distance between two points and establish the correct slope and angle for a roadway.
- **Circuit Analysis:** Engineers use algebra to analyse and design electrical circuits, which involves solving equations related to voltage, current, resistance, and power.
- **Mechanical Systems:** Algebra is used to model and analyse mechanical systems such as engines and structures to optimize design and production.
- **Control Systems:** In control systems, algebra helps engineers design and analyse feedback systems using transfer functions and Laplace transforms.
- **Fluid Dynamics:** Algebra is used to model fluid flow in pipes, channels, and other structures in order to determine flow rates and pressure losses.
- **Signal Processing:** Algebra plays a key role in signal processing applications such as image and speech processing, where engineers use mathematical equations to analyse and manipulate signals.
- **Optimisation:** Engineers use algebra to optimize design parameters such as material strength, weight, and cost, by solving systems of equations that describe the relationship between these parameters.

ENGLISH

- **Analyzing Language Patterns:** Algebraic expressions often involve identifying and analyzing patterns. Apply this concept to language patterns by having students identify recurring words, phrases, or structures in texts. Ask them to represent these patterns using algebraic symbols or equations. For example, they could express a recurring motif or theme as an algebraic equation and discuss its significance.
- **Character Analysis:** Encourage students to analyze characters in literature using algebraic concepts. They can assign variables to different character traits and use algebraic equations to describe relationships between characters. For instance, they can create equations that represent the evolving dynamics between characters throughout a story and discuss how these equations reflect their interactions.
- **Word Problems:** Develop word problems that combine elements of algebra and English language skills. These problems can relate to literary themes, plot points, or language concepts. For example, you could create a word problem that requires students to solve for an unknown variable related to a literary passage or poem. This exercise can help them think critically about both mathematical and literary concepts.
- **Symbolism and Metaphor:** Algebraic symbols can be related to literary symbolism and metaphors. Teach students to identify and interpret symbolic representations in both algebra and literature. Encourage them to explore how algebraic symbols can be used to represent abstract ideas or concepts in a literary work. This exercise can deepen their understanding of symbolism and metaphorical language.
- **Data Analysis:** In English language and literature, students often analyze data presented in texts, such as graphs, charts, or tables. Relate this to algebra by incorporating data analysis techniques. Students can interpret data presented in literary texts and use algebraic equations to model or analyze trends. This approach encourages students to apply algebraic thinking to real world data in a literary context.

FABRICATION AND WELDING

- **Fabrication and Welding** Algebra is used in fabrication and welding to calculate measurements and angles for cutting, shaping, and welding metals and alloys.
- **Fabricator and Welder** A fabricator and welder use algebra to calculate the correct angle for cutting metal to fit a particular project, and how much material will be needed for a project.
- **Determining the length of pipe required for a job:** In welding and fabrication, pipes of different sizes and lengths are used to form structures. Algebra is used to determine the length of the pipe required, given its diameter and the desired final length.
- **Computing the amount of material required:** Algebra is also used to calculate the amount of material required for a job. For instance, if you need to fabricate a structure with a specific thickness, width, and length, you can use algebra to calculate the volume of material required.
- **Calculating the angle of bend for pipes:** In welding and fabrication, pipes are often bent to form a structure. Algebra is used to calculate the angle of bend required to form a particular shape. The angle of bend is a function of the diameter, wall thickness, and radius of the bend.
- **Determining the welding parameters:** Algebra is used to compute the welding parameters required for a particular job. This includes the welding current, voltage, and travel speed, which determine the strength and quality of the weld.
- **Calculating stresses and strains in structures:** Algebra is also used to calculate stresses and strains in structures. This is important in ensuring that the structure can withstand the loads it is designed for. In fabrication and welding, this includes calculating the bending, shear, and torsional stresses in different parts of the structure.

HAIR AND BEAUTY

- **Beauty and Personal Care** Hairdressers and beauticians use algebra to calculate formulas and ratios accurately when mixing hair dyes and other beauty products. Aestheticians use algebra to calculate the right combinations of skincare ingredients for treatments.
- **Hairdresser** - A hairdresser uses algebra to determine the right ratio of hair dye to developer for each client's hair colour and volume.
- **Mixing hair dye:** In hairdressing, the hair dye is often mixed using algebraic equations. For example, if you want to mix two different shades of hair dye together, you may need to use a formula to determine how much of each colour to use to achieve the desired result.
- **Measuring hair products:** In beauty therapy, hair products like shampoos and conditioners are often measured using algebraic equations. For example, if you have a bottle of shampoo that contains 10 ounces of product and you need to use 2 ounces per customer, you can use algebra to determine how many customers you can serve with one bottle.
- **Calculating haircuts:** In hairdressing, the angles and lengths of haircuts are often calculated using algebraic formulas. For example, a layered haircut will require specific angles and lengths to be cut at each layer, and these can be calculated using algebra.
- **Mixing facial masks:** In beauty therapy, facial masks are often mixed using algebraic equations. For example, if you need to mix two different types of facial masks together, you may need to use a formula to determine how much of each mask to use to achieve the desired result.
- **Calculating waxing formulas:** In beauty therapy, waxing formulas are often calculated using algebraic formulas. For example, if you need to remove hair from a customer's face, you may need to use an algebraic equation to determine how much wax to use and at what temperature to heat it to achieve the desired result.

HEALTH, SOCIAL AND CHILDCARE

- **Dosage Calculations:** In health care, nurses and doctors use algebra to calculate the correct dosages of medications. For example, if the doctor prescribes 250mg of medication, the nurse uses algebra to determine how many tablets or millilitres of liquid are needed to administer the correct dose.
- **Calorie Counting:** In social and childcare settings, algebra is used to calculate the calories in different foods and to create balanced meal plans for individuals. For example, if a person needs 1800 calories per day, an algebraic equation can be used to allocate the correct amounts of protein, carbohydrates and fats in each meal.
- **Growth Charting:** In child development, algebraic formulas can help to determine whether a child is growing at a healthy rate. For example, a paediatrician may use algebra to calculate a child's body mass index (BMI) to determine their growth patterns in relation to standards for their age.
- **Scheduling Staff:** In care settings, algebra is used to schedule staff so that the appropriate number of caregivers is available to support each patient or client. For example, if each patient requires 3 hours of daily care, an algebraic equation can help to determine how many caregivers are needed to maintain the appropriate level of care for all patients.

HOSPITALITY

- **Menu pricing:** Restaurants use algebra to determine the cost of ingredients, labor, and overhead expenses that go into making a dish. By using formulas for cost percentage, markup, and profit margin, restaurants can determine the price to charge for a menu item.
- **Recipe scaling:** Professional cooks use algebra to adjust recipe quantities to accommodate the number of servings needed. By using proportional reasoning, they can double, triple, or halve a recipe to meet the needs of their customers.
- **Inventory management:** Hospitality businesses use algebraic formulas to calculate the inventory turnover rate, which is the ratio of the cost of goods sold to the average inventory held in a given period. This helps them determine how quickly they are selling inventory and make informed decisions about ordering and stocking supplies.
- **Kitchen measurements:** Professional cooks use algebraic equations to convert measurements between units. For example, converting grams to ounces or litres to cups requires using algebraic formulas to determine the equivalent amount.
- **Recipe costing:** Algebra is used to calculate the cost of each ingredient in a recipe by multiplying the quantity used by the unit cost. This information is then used to determine the overall cost of the recipe.

MERCHANT NAVY CADETSHIPS

- Calculating fuel consumption, based on the distance and speed of the ship. This requires solving algebraic equations to determine the amount of fuel required for a given distance.
- Determining the cargo capacity of a ship, based on its dimensions and weight. Algebraic equations can be used to relate the different parameters and solve for the unknown variable.
- Calculating the trajectory of a ship, taking into account the wind and ocean currents. This requires the use of algebraic equations to model the forces acting on the ship and determine its path.
- Determining the time needed to complete a voyage, based on the distance and speed of the ship. Algebraic equations can be used to find the time required to cover a certain distance at a given speed.
- Estimating the weight and balance of a ship, based on the distribution of cargo and supplies. This requires solving equations to balance the different weights and ensure the stability of the ship.

MOTOR VEHICLE

- **Motor Mechanics and Motor Body Work** Algebra is used in motor mechanics and motor body work to calculate measurements and ratios for repairs and modifications.
- **Motor Mechanic** A motor mechanic uses algebra to calculate the correct ratio of fuel and air in an internal combustion engine to ensure efficient and proper operation.
- **Calculating work:** Algebraic equations are used to calculate the work done on a vehicle during repairs or maintenance. For example, the work done in removing a dent from a car can be represented by the equation $W = Fd$, where F is the force applied and d is the distance moved.
- **Calculating pressure:** Algebra is used to calculate pressure, which is important for measuring the condition of various automotive systems, such as brakes, suspension, and tires. The equation for calculating pressure is $P = F/A$, where F is the force applied and A is the area on which the force is applied.
- **Finding displacement:** Algebra is used to calculate displacement, which is the change in position of a vehicle over time. This is important for diagnosing problems with the steering or suspension systems. The equation for calculating displacement is $s = ut + \frac{1}{2}at^2$, where s is the displacement, u is the initial velocity, a is the acceleration, and t is the time elapsed.
- **Calculating torque:** Algebraic equations are used to calculate the torque required to loosen or tighten bolts and nuts during repairs. The equation for calculating torque is $T = Fd$, where T is the torque, F is the force applied, and d is the distance from the center of rotation.
- **Calculating power:** Algebra is used to calculate power, which is the rate at which work is done. This is important for measuring the efficiency of automotive engines and transmissions. The equation for calculating power is $P = W/t$, where P is the power, W is the work done, and t is the time taken.

MUSIC

- Frequency and pitch: The frequency of a sound wave can be represented by a mathematical equation, $f = 1/T$, where f is the frequency, and T is the period of the wave. In music, this equation is used to determine the pitch of a note.
- Musical notation: The use of musical notation involves algebraic symbols, such as notes and rhythms, to represent different sounds and durations in a piece of music.
- Chord progressions: Chord progressions in music involve the use of algebraic principles to create different harmonic structures based on intervals and relationships between notes.
- Harmony: Harmony in music involves the use of algebraic principles to create chords, chord progressions, and other harmonic structures.
- Scaling and tuning: Tuning systems and scale structures in music are based on mathematical principles, such as the logarithmic relationship between frequencies in different octaves.

PRODUCTION DESIGN AND DEVELOPMENT

- **Digital Media** Algebra is used in digital media to create special effects, manipulate images and audio, and design graphics.
- Animators and video game designers use algebra to manipulate lighting and camera angles.
- **Calculating Aspect Ratio:** In TV production, it is important to maintain a consistent aspect ratio, which is the ratio of the width to height of the screen image. It can be calculated using algebraic equations like:
Aspect Ratio = Screen Width / Screen Height
- **Scaling Videography:** Sometimes, different cameras shoot different footage that needs to be re sized to match the desired resolution and aspect ratio. Algebraic equations involving ratios and proportions can be used to scale down or up the videos while maintaining the image quality.
- **Budgeting:** Algebra is used to calculate expenses like equipment costs, salaries, insurance, travel, transportation, etc., which are critical in the production budgeting process.
- **Lighting:** Algebraic calculations are used to determine proper light levels for a scene. For example, calculations that take into account the brightness of all the light sources, and the distance between the lights and the subject, can be used to adjust the lighting to the desired level.
- **Motion Graphics:** Algebra is used in creating motion graphics, which are complex animations and graphics used in TV broadcasts. Many equations are used to calculate motion, velocity, acceleration, and elasticity of objects for creating realistic animations.

SPORT

- **Sport** Algebra is used in sports to analyse statistics and performance data for athletes and teams.
- **Sports Analyst** A sports analyst uses algebra to calculate win loss and batting averages of a particular player or team, as well as other statistical measures of performance
- **Trajectory of a basketball shot:** Algebra is used to calculate the distance, angle, and force required to make a successful shot in basketball. This includes calculations of the parabolic trajectory of the ball.
- **Determining speed and acceleration in track and field:** Algebra is used to calculate the speed and acceleration of athletes during sprints and racing events.
- **Calculating the force required for a weightlifter:** Algebra is used to calculate the force required for weightlifters to lift different weights, using the formula $F = m \times g$, where F is force, m is the mass of the weight, and g is gravitational acceleration.
- **Estimating the distance a long jumper can jump:** Algebra is used to calculate the distance a long jumper can jump based on their speed and the time they spend in the air.
- **Measuring the extent of a player's performance:** Algebra is used to measure the performance of players in team sports like basketball, using statistical analysis such as calculating a player's shooting percentage or assists per game.
- **Calculating time and distance in swimming events:** Algebra is used to calculate the time and distance in swimming events like freestyle sprints and relays.
- **Analysing the trajectory of a football pass:** Algebra is used to calculate the trajectory of a football pass, including the height and distance the ball must travel, as well as the force required to throw the ball accurately.
- **Measuring the force of impact in martial arts:** Algebra is used to calculate the force of impact in martial arts strikes like punches and kicks.

TRAVEL AND TOURISM

- Travel and Tourism - Algebra is used in travel and tourism to calculate rates, budgets, and profit margins. It can help the industry to determine effective pricing strategies and make informed decisions.
- Travel Agent - A travel agent uses algebra to calculate the per-person cost of a vacation package, factoring in hotel, airfare, meals, and other expenses.
- Travel and Tourism - Algebra is used in travel and tourism to calculate rates, budgets, and profit margins. It can help the industry to determine effective pricing strategies and make informed decisions.
- Hotel Manager - A hotel manager uses algebra to calculate the profit margin of the hotel based on occupancy rate, total expenses, and room rates

UNIFORMED AND PUBLIC SERVICES – ARMED FORCES

- Calculating the trajectory of a missile or a jet using equations of kinematics and trigonometry.
- Determining the speed of an object based on distance and time using algebraic equations.
- Computing the amount of fuel needed for a mission using algebraic equations.
- Balancing budgets and expenses using algebraic equation.
- Using algebraic equations to calculate force, power, and work in mechanical and electrical systems.
- Determining the angles and lengths of geometric shapes involved in camouflage and cover operations.
- Applying quadratic equations to set up maps, determine the position, and plot courses for navigation.
- Conducting statistical analysis using algebraic equations to identify trends in crime, disease, or population movements.
- Solving equations to adjust the parameters of a weapon system in the battlefield.

UNIFORMED AND PUBLIC SERVICES – POLICE, AMBULANCE, FIRE

- 1. Police:
 - Calculating the distance and speed of a vehicle involved in a crime or accident using the formula $\text{distance} = \text{speed} \times \text{time}$
 - Analysing crime patterns and trends to identify areas in which extra police officers should be deployed
 - Using mathematical models to predict the likelihood of certain crimes occurring in specific areas
 - Calculating how long it will take for backup to arrive at a scene based on their distance and speed.
- 2. Fire Brigade:
 - Calculating the water pressure and flow rate needed to extinguish a fire using the equation $p = F/A$ (pressure equals force divided by area)
 - Determining the height and angle at which to aim a fire hose to reach a certain point
 - Calculating the maximum weight a ladder can support based on its length and the force of gravity acting on objects placed on it.

UNIFORMED AND PUBLIC SERVICES – POLICE, AMBULANCE, FIRE CONTINUED

- 3. Ambulance:
- Calculating the amount of medication to administer to a patient based on their weight and the prescribed dosage
- Using the ABC (airway, breathing, circulation) algorithm to determine the severity of a patient's condition and prioritize their treatment
- Calculating the amount of time it will take to reach a hospital or medical facility based on the distance and traffic conditions.