

ACHIEVER'S EDUCATION CONSULTANT
08141710097
SUMMARY OF MTH105 WITH PAST QUESTIONS

Introduction

MTH 105 - MATHEMATICS FOR MANAGEMENT SCIENCES I is designed to teach you how mathematics could be used in solving problems in the contemporary business world. Therefore, the course is structured to expose you to the skills required in order to attain a level of proficiency in business management.

What you will learn in this course

You will be taught the basis of mathematics required in solving problems in business.

Course Aims

You should read the objectives of each unit and bear them in mind as you go through the unit.

Course Objectives The objectives of this course are

☐ Educate learners on how to use mathematical Techniques in solving problems. ☐ Educate the learners on how to integrate mathematical models in business.

[...]

Every unit contains a list of references and further reading. Try to get as many as possible of those textbooks and materials listed. The textbooks and materials are meant to deepen your knowledge of the course.

Assignment File

In this file, you will find all the details of the work you must submit to your tutor for marking. The marks you obtain from these assignments will count towards the final mark you obtain for this course. Further information on assignments will be found in the Assignment File itself and later in this Course Guide in the section on assessment.

Presentation Schedule The Presentation Schedule included in your course materials gives you the important dates for the completion of tutor-marked assignments and attending tutorials.

Remember, you are required to submit all your assignments by the due date. You should guard against falling behind in your work. Your assessment will be based on tutor-marked assignments and a final examination which you will write at the end of the course.

Tutor Marked Assignments

You are advised to work through all the assignments and submit them for assessment. Your tutor will assess the assignments and select four which will constitute the 30% of your final grade. The tutor-marked assignments may be presented to you in a separate file.

Final Examination and Grading

At the end of the course, you will write a final examination which will constitute 70% of your final grade. In the examination which shall last for two hours, you will be requested to answer three questions out of at least five questions. Course Marking Scheme This table shows how the actual course marking is broken down.

[...]

In distance learning, the study units replace the university lecture. Think of it as reading the lecture instead of listening to the lecturer. In the same way a lecturer might give you some reading to do, the study units tell you when to read, and which are your text materials or set books. You are provided exercises to do at appropriate points, just as a lecturer might give you an in-class exercise.

The first item is an introduction to the subject matter of the unit, and how a particular unit is integrated with the other units and the course as a whole. Next to this is a set of learning objectives. These objectives let you know what you should be able to do by the time you have completed the unit. These learning objectives are meant to guide your study.

The moment a unit is finished, you must go back and check whether you have achieved the objectives. If this is made a habit, then you will significantly improve your chances of passing the course. The main body of the unit guides you through the required reading from other sources. This will usually be either from your set books or from a Reading section.

The following is a practical strategy for working through the course. If you run into any trouble, telephone your tutor. When you need assistance, do not hesitate to call and ask your tutor to provide it.

In addition do the following

Note the time you are expected to spend on each unit and how the assignments relate to the units. Important information, e.g. details of your tutorials, and the date of the first day of the Semester is available from the study centre. You need to gather all the information into one place, such as your diary or a wall calendar. Whatever method you choose to use, you should decide on and write in your own dates and schedule of work for each unit.

Once you have created your own study schedule, do everything to stay faithful to it. If you get into difficulties with your schedule, please, let your tutor know before it is too late for help. You will need your set books and the unit you are studying at any point in time. Keep in touch with your study centre.

Up-to-date course information will be continuously available there. Well before the relevant due dates, keep in mind that you will learn a lot by doing the assignment carefully. They have been designed to help you meet the objectives of the course and, therefore, will help you pass the examination. When you are confident that you have achieved a unit's objectives, you can start on the next unit.

Proceed unit by unit through the course and try to pace your study so that you keep yourself on schedule. When you have submitted an assignment to your tutor for marking, do not wait for its return before starting on the next unit. When the Assignment is returned, pay particular attention to your tutor's comments, both on the tutormarked assignment form and also the written comments on the ordinary assignments. Check that you have achieved the unit objectives and the course objectives.

Tutors and Tutorials The dates, times and locations of these tutorials will be made available to you, together with the name, telephone number and the address of your tutor. Each assignment will be marked by your tutor. This course would train you on the concept of multimedia, production and utilization of it.

[...]

☐ Solve simple problems using mathematical symbols and logic. Symbol in this context is a letter that is made to represent a statement or an argument.

The Truth Value of this is True „T“

The Truth Value Table can be used to depict or analyze the Truth Value of any mathematical statement. Find the Truth Table of $p \rightarrow q$, meaning . This shall be expandable in this further study. Some Objectives of Symbolic Logic Reasoning Logical reasoning could be used to ascertain or analyze complicated business argument.

It could be used to decode equivalent, negation or contradictory propositions. It could be used to form composite statements from simple ones using logical connectives.

Rose flower is red

Accra is in Nigeria The proposition/statement/ascertain above are simple ones and can either be true or false. However, a composite statement is the use of connectives to combine two or more simple statements to form just one.

Accra is in Nigeria implies that $2 + 5 = 4$

The Truth Value of a composite statement is determined by the Truth Value of each of the simple statements and the way they are connected.

[...]

Other connectives could be used but must be defined properly. An argument may be valid or invalid. If the conclusion derives its support from its support from its premises, the argument is said to be valid, otherwise invalid.

Lagos is in Nigeria Nigeria is in West Africa

The fundamental property of a logical statement is that it is either true or false but not both. The Truth Value of the composite statement $p \vee q$ satisfies the following property.

Consider the following four propositions

This is the exact order the statement above follows, but in the final presentation, the Truth Value Table must be formulated considering Truth first before False.

Please see the acceptable way below

Any two statements can be combined by the word “or”, to form another statement. The disjunction of p and q is denoted by $p \vee q$. The symbol can be used to define union of two sets.

Consider the following four statements

If is true, is false.

Conditional statement is of the form “if p then q ”

The conditional is true unless p is true and q is false. In other words, a true statement cannot imply a false statement.

2 Bi-conditional

Consider the statement of the form “ p if and only if q ” or $p \leftrightarrow q$ and can be denoted by $\leftrightarrow$. If p and q have the same Truth Value, then $p \leftrightarrow q$ is true.

Then, Is “He is not born again”

4 $\sim q \leftrightarrow \sim p$ is called the contra-positive of $p \leftrightarrow q$. He cannot see the kingdom of God implies that he is not born again. In conclusion, Logic as science of reasoning has been thoroughly dealt with in this section. However, some real life happenings have been demonstrated in the examples and even in the summary below.

Is the following argument valid?

“If the temperature is set for 200C, the chemical will not explode.

MATRICES AND DETERMINANT

At the end of this unit, you should be able to solve physical problem via matrix algebra as a mathematical model. A matrix is a rectangular array of numbers with reference to specific rules governing the array. The rule can be mathematically expressed. Thus, let the entries or numbers be denoted by a a_{ij} Where i infers row arrangement i.e. a_{11} and j infers column arrangement i.e. a_{11} .

Column

1, 2, 3 i represent elements in the row while j represent elements in the column for better understanding of the row-column concept, let the elements of ith row and jth column of matrix be a_{ij} i.e. Let matrix A be $A = [a_{ij}]$, then matrix A^T is called “the transpose of A”.

$A^T = [a_{ji}]$

Two matrices are said to be equal if their corresponding elements are the same.

$[a_{ij}] = [b_{ij}]$

Comparing the two matrices to be equal.

[...]

A matrix is said to be singular if the determinant is equal to zero.

Given that $A = k$

It could be used to solve linear equations.

[...]

We are interested in finding the values of x and y.

[...]

Cramer’s rule can be extended to systems of three equations with three unknowns.

[...]

Find how many barrels of each type of spray will be used to just meet the requirements.

Adj $A = \begin{bmatrix} 1 & 2 & 1 \end{bmatrix}$

® We need 1 barrel of spray P, 2 barrels of spray Q and 3 barrels of spray R to meet the requirement. In a market survey, three commodities A, B, C were considered. In finding out the index number, some fixed weights were assigned to three varieties in each of the commodities.

[...]

Let x, y, z be the weights assigned to A, B, C respectively.

[...]

In conclusion, matrix algebra forms the basis of various techniques used in solving cumbersome business and technical related situations.

[...]

An amount of N500.00 is put into three investments at the rates of 6, 7 and 8 percent per annum respectively.

$$2P_2 + 2P_3 = 3$$

A salesman has the following record of sales during three months for three items A, B and C which has different rates of commission.

$$0 \text{ If } a = 0 \text{ } a =$$

Special Cases If $AB = 0$, then $A = B$ and this is called a zero vector. If $AB = 1$, then AB and this is called a unit vector. This is represented as λa_p , or λb_p , respectively.

Let AB and BC represent a and b , therefore the addition of AB and BC is

$AB + BC = AC$, called resultant vector. The sum c is then given by the single vector joining the start of the first to the end of the second vector.

DB

Where r is a scalar quantity multiplying CD , a vector quantity.

MATHEMATICS FOR MANAGEMENT SCIENCES I

4 $OP = r = xi + yj$ The vector $OP = r$ is called the position of point „p“ in the plane with reference to the origin.

$$OP^2 = OM^2 + MP^2$$

Where r is called the magnitude or the modulus of the vector, r .

[...]

A complex variable z is of the form $a + bi$, where a and b are real numbers and i is called the imaginary number. Mathematically, $z = a + bi$ Two complex numbers z_1 and z_2 are equal if their real parts are equal. Suppose a complex number is $z = a + bi$, then $\bar{z} = a - bi$ is called the conjugate of the complex number, $|z|^2 = a^2 + b^2$, where $i^2 = -1$.

The distance between two points $z_1 = a + bi$ and $z_2 = c + di$ in complex plane is given by: $|z_1 - z_2| = \sqrt{(a-c)^2 + (b-d)^2}$

Find the distance between the points z_1 and z_2 , given that $z_1 = 3 + 2i$ and $z_2 = 4 + 3i$.

$$3 + 2i \quad 12 - 9i + 8i + 6 = 18 - i$$

If $z = x + iy$, $z = r \cos \theta + r i \sin \theta$ is called the polar form of z .

[...]

Intersection of two Lines This is an equation of the first degree, it is an equation containing no higher powers than the first of x and y , and is of the type $y = mx + c$ where m and c are both constants. A point P means that P is in the $-plane$, where x is called the abscissa and y is the ordinate. Therefore the x and y coordinates of a point are called the rectangular Cartesian coordinates of the point.

Note here that

A straight line is formed when two points are joined together.

We The distance $QC =$, $PC =$

$4PQ = ?$ is the required distance. This is the formula for finding the distance between two points.

Distance $BC =$

The slope of a straight line can be defined in respect to the angle of inclination of the line with the x -axis i.e. .

The equation of the line is

This is the equation of a line passing through the origin.

$$y = x$$

Intersection of Two Lines The necessary and sufficient conditions for two lines to intersect are that they must be consistent and independent.

$$2x + 3y = 5 \quad 2x + 3 = 5 \quad 2x + 5 - 3 = 2$$

If UAC Foods use 10 bags of flour and 5 tins of butter to produce 100 raps of gala and UTC uses 15 bags of flour and 8 tins of butter to produce 120 raps of gala. Find how many raps of gala that can be produced from 30 bags of flour and 15 tins of butter.

Equation –

Parallel Lines Two lines are said to be parallel if their gradient is the same i.e. They have equal rate of change. Alternatively, if the angle between two lines is zero, it means that they are parallel.

Let m_1 and m_2 be the slope of lines AB and CD

Perpendicular Lines The product of their gradient must be equal to -1.

$$2y = 2y + 4$$

This is the amount of goods requested for by customers at any point in time. 11 boxes of Lux soap are demanded for, each box costs N300. 20 boxes of Premier soap are also required by customers, each box costs N350.

$$20 = 350 + c$$

This will enable graphs of functions to be easily defined. Functions of inequalities can be Linear, Quadratic, etc...

Graph of $18x - 3x^2 > 0$

Graph of Straight line graph is dealt with, both parallel and perpendicular lines and their relationship to business problems. Some illustrative examples are shown in examples 8,9 and 10 above.

Draw the graphs of the following inequalities

2 Introduction to Mathematical Economics By Edward T. Dowling.

INTRODUCTION TO CIRCLE

This unit will introduce you to the properties of equation of a circle, detailing how these properties could be used to solve day-day problems. At the end of this unit, you should be able to solve simple problems involving equation of a circle. A circle could be described by its centre and its radius.

The equation of the circle centre and radius 4 is

The equation must be second degree or simply in second degree of x and y respectively.

Also, $c = g^2 + f^2 - r^2$

Simple problems involving equation of circle and some properties of circle is also discoursed.

SIMPLE SEQUENCE AND SERIES

□ find the sum of an arithmetic progressions, □ find the sum of a geometric progressions, □ apply it to simple and compound interest problems, □ commerce related problems. A sequence may be finite or infinite. A finite sequence is one whose first and last element are known, while an infinite sequence is one whose terms are uncountable.

$$2n - 1$$

Following the same pattern The last term or general term for an Arithmetic Sequence is $U_n = a + d$.

Let, d be the common difference

Equation and can be solved simultaneously.

[...]

In this unit, you will learn about properties on limits, limits at infinity, discrete and continuous variable and how each of these could be used to solve problems. □ State the properties on limits, □ obtain limits at infinity, □ identify the variables that could affect limits, □ solve problems involving limits. Limits describe what happen to a function f , as its variable x approaches a particular number, say c . If the value f is k as x approaches c , then, the number k is said to be the limit of the function f as x approaches c .

It should be note that, if the function f does not get closer and closer to a number as x gets closer to c , then, it means that the function f has no limit as $x \rightarrow c$.

Consider the function: $f = \{$

Mathematically speaking, the function is not defined as $x = 3$, but defined as $x \neq 3$.

From Right

Find the $\lim_{x \rightarrow 3} x$ is called modulus of x or absolute value of x .

0 for $x > 0$

$= 1$, positive sense If $x < 0$, that is negative x .

[...]

We can see from above that as x tends to infinity, f is getting to zero.

Given the function $H =$

The fixed cost of producing the first 50 piglets is N25,000.00 and the variable cost, each is N500.00. You will recall that the fixed cost is the cost that does not vary with the level of production. Now, let y be the number of the piglets to be produced and supplied.

Number of Piglets

In conclusion, all polynomial functions are continuous, as are all rational functions, except where undefined, i.e. where their denominators are zero. Consequently, for any function to be continuous, the limit must exist. Furthermore, we discussed continuity. It can be drawn without lifting the pencil from the paper.

A function is continuous at $x = a$ if the three properties mentioned above exists. Practical examples related to business were illustrated.

DIFFERENTIATION AND INTEGRATION

Differentiation could be said to be the inverse of integration .this shall be seen as we continue in this section. | by f' called f' of x .

[...]

Note that the derivative of a constant is equal to zero.

[...]

Alternatively, we can expand the function and use the rule of sum i.e. .

x^2

If $y = \sin^{-1} x$, meaning arc sin x .

[...]

Try $y = \cos^{-1} x$ in the same way If given that $y = \lambda x$, i.e. exponential function of x , then $\frac{dy}{dx} = \lambda u$.

Evaluate the following integral

The management of LASU is considering the purchase of one of the three annexes of hers in three years time when funds become available.

As in summary

Basic rules of differentiation was discussed, the rules were applied to their sums and differences, products, quotients and function of functions. Basic rule of integration and its application to business was also discussed.

VALUE

This section introduces us to further application of differentiation.

Try this in the same way

Turning points can be maximum or minimum.

Find the second derivative of the function; and

Find the value of each of the turning point in the second derivative. The value of the original function $y = f$ at the maximum point is the maximum value of the function, while the value of the function at the minimum point gives the minimum value.

Put $x = 2$ into

At second derivative, $8 > -8$, At turning point 2, the function is maximum.

At turning point

At point of inflexion, the turning points are equal. At point of inflexion, the value of the stationary point at the second derivative is zero.

A function f is said to have a relative maximum value at $x = a$ if f is greater than immediately preceding and succeeding in values of the The function f is said to have a **relative minimum value at $x = a$ if f is smaller than immediately preceding and succeeding values of the**

These definitions would be applied to areas in Business as could be seen in the following examples. The total cost of producing x set of shoes is $N(x^2 + 35x + 25)$ and the price set at which they may be sold is $N(50 - x)$.

What should be the daily output to obtain a maximum total profit?

Show that the cost of producing a set is a relative minimum.

Profit on sales is $p = x(50 - x) - (x^2 + 35x + 24)$

Production to give maximum profit is 10 set per day.

[...]

The cost of fuel in running a generator is proportional to the square of the speed and is N25 per hour for a speed of 40kmh⁻¹. Let w be the required speed. $64w^2$ dc dw $64w^2$ dc = Its application to business was also discussed.

Find the maximum and minimum points and the value of y at the turning point: $y = 2x^3 + 3x^2 - 36x$ $y = x^3 - 3x^2 + 3x + 2$

The sum of the base radius and height of a right circular cone is to be 6metres, find the greatest possible volume of the cone.

INEQUALITIES

This is the mathematical techniques for finding the optimum mix of products with limited resources. The resource limitations are represented graphically by areas which when combined form a feasibility region. Purchasing.

Linear programming reduces the kind of problems outlined above to

Define the constraints i.e. the limitations that must be placed on the variables. Manipulate the objective function to find the optimum feasible solution.

Example 1

One chalet which makes a contribution of N50T, takes six hours material purchasing time, and four hours construction or assemblage time. While one road makes a contribution of N40T, takes three hours material purchasing time and eight hours construction time. There is a maximum of thirty-six purchasing of materials hours available each week and forty-eight construction hours respectively. Let x be the number of chalets constructed each week.

y be the number of roads constructed each week. Similarly, the total time required to construct x chalets and y roads is hours.

[...]

In addition, the logic constraints must be stated i.e $0 \leq x$ and $0 \leq y$. These simply states that there cannot be negative amounts of chalets and roads. Where the constraint is of the form $ax + by \leq c$, as in both of the above cases, the values of x and y can lie anywhere on the line or below it. If the constraints is of the form $ax + by \geq c$, x and y can only lie on the line or above it.

This is the above example, x and y must be on or below the line

Not below the x -axis and not to the left of the y -axis. Combinations of the two products which are achievable given the constraints. The problem is to find the optimum solution.

There are two approaches to this final step

This is the recommended approach particularly for more complex problems. Slack is the amount by which a resource is under utilized. It will occur when the "optimum point does not full the given resource line. This can be checked from the constraint inequalities by solving the two simultaneous equations for the two constraints boundaries.

Slack = $36 - 18 = 18$ hours

Each unit of product G requires 30 minutes in the Food & be department and 10 minutes in the packaging department. Each day, 900 minutes are available in the food/beverages department and 700 minutes are available in the packaging department. The sales manager wishes to have a daily output of at least 40 products irrespectively of whether they are Gala and Nourish bread are N32 and N40 respectively. Let the recommended output levels of Gala and Nourish by g and n respectively.

Cost Contribution

All these are generated from the graph above.

The optimal output levels are

In conclusion, the basic rule of linear programming have been discussed .

$3x + 7y \leq 28$ $x + y \leq 6$ $x \geq 0$ $y \geq 0$

Assuming that all lamps made can be sold without difficulty, determine production figures that maximize the profit.

FBQ1: ... is the amount by which a resource is under utilized

Answer: Slack

FBQ2: ... is the point at which the curve is neither a maximum nor a minimum value

Answer: Point of reflexion

FBQ3: At point of inflexion, the turning points are.....

Answer: Equal

FBQ4: If the value of turning point in the second derivative is negative, then it is a ...

Answer: Maximum point

FBQ5: If the value of turning point in the second derivative is positive, then it is a

Answer: Minimum point

FBQ6: These are point on
the curve at which

 and the value of the function at this point is
called.....

Answer: stationary point

FBQ7: Stationary points are also called.....

Answer: turning point

FBQ8: The coordinate of the point of interception of the lines, $2x + 3y = 5$ and $x + 2y = 3$,
is.....

Answer: (1, 1)

FBQ9: If $y = c$, where c is a constant, then $\frac{\delta y}{\delta x}$ yields....

Answer: 0

FBQ10: Given the function $H(x) = kx + 3$ for $x < 2$ and $3x^2 - x + 3$ for $x \geq 2$. The values of
„k“ for which $H(x)$ is continuous at $x = 2$ is ...

Answer: $K=5$

FBQ11: The $\lim_{n \rightarrow \infty} \frac{f(n)}{n^2} - 2x$ is

Answer: 7

FBQ12: The limit of function $f(x) = 12x$ as $x \rightarrow 0$, is

Answer: 1

FBQ13: The limit of function $f(x) = 12x$ as $x \rightarrow 2$, is

Answer: $\frac{1}{4}$

FBQ14: ... describe what happen to a function $f(x)$, as its variable x approaches a particular
number, say c

Answer: Limit

FBQ15: The common ratio of the G.P 2, 6, 18, 54, 162, is ...

Answer: 3

FBQ16: A ... is a sequence in which each successive terms of the sequence are in equal ratio.

Answer: geometric progression

FBQ17: The 7th term of an A.P is 15 and the fourth term is 9. The first term and the common difference are ... and ... respectively

Answer: 3, 2

FBQ18: The 7th term of an A.P whose first term is 102 and common difference is -3 is

Answer: 84

FBQ19: The square of common difference of the sequence 3, 5, 7, 9, 11,... is

Answer: 4

FBQ20: ... is a sequence in which each term differs by a common difference

Answer: Arithmetic progression

FBQ21: An infinite sequence is one whose terms are...

Answer: Uncountable

FBQ22: is a succession of terms spanned by a rule or formula.

Answer: A sequence

FBQ23: ... is the amount of goods requested for by customers at any point in time.

Answer: Demand

FBQ24: The demand curve is the relationship between quantity and of goods

Answer: Price

FBQ25: A physical quantity having both magnitude and direction is called ____

Answer: vector

FBQ26: The necessary and sufficient conditions for two lines to intercept are that they must be consistent and

Answer: Independent

FBQ27: A good application of intercept of two lines is the.....

Answer: market equilibrium

FBQ28: will the equation of a line (-1, -4) whose gradient is 1?

Answer: $y=x-3$

FBQ29: The equation of a straight line is of the form

Answer: $y=mx+c$

FBQ30: The distance between the pairs of points A(0, 1) and B(6, 9) is

Answer: 10

FBQ31: By a point P(x, y) we mean that P is in the plane

Answer: (x, y)

FBQ32: $z^n = [r(\cos\theta + i\sin\theta)]^n$ is called the theorem

Answer: De Moivre's

FBQ33: If $z = x + iy$, $\Rightarrow z = r \cos\theta + r i \sin\theta$ is called the... of z.

Answer: polar form

FBQ34: Let A be a square matrix where the element $a_{ij} = 0$. For $i > j$, then A is called.....

Answer: An upper triangular matrix

FBQ35: The distance between (0, 1) and (6, 9) is _____

Answer: 10

FBQ35: The gradient of the line perpendicular to $x + 3y = 2$ is

Answer: 3

FBQ36: The determinant of is

Answer: -1

FBQ37: Let ; . Given that $|AB| = 121$, find the value of k

Answer: -3

FBQ38: For what value of m would the matrix be singular?

Answer: 2

FBQ39: Calculate the distance between the points: A(0,1) and B(6,9)

Answer: 10

FBQ40: The negation of tautology is a _____

Answer: contradiction

FBQ41: The magnitude of the vector is _____

Answer: 13

FBQ42: The magnitude of the vector is _____

Answer: 5

FBQ43: Two vectors are said to be ____ if they are in equal direction

Answer: parallel

FBQ44: A _____ is a succession of terms spanned by a rule or formula

Answer: sequence

FBQ45: A sequence in which each term differs by a common difference is known as _____

Answer: Arithmetic Sequence

FBQ46: The 6th term of an A.P whose first term is 102 and common difference is -3 is _____

Answer: 87

FBQ47: the point at which the curve is neither a maximum nor a minimum value is called point of _____

Answer: inflexion

FBQ48: The 11th term of an A.P whose first term is 102 and common difference is -3

Answer: 72

FBQ49: _____ sequence is a sequence in which each successive terms of the sequence are in equal ratio

Answer: geometric

FBQ50: A _____ sequence is one whose first and last element are known

Answer: finite

MCQ1: ... is the study and analysis of a mathematical proposition as to ascertain the Truth Value of the proposition.

Answer: Logic

MCQ2: Lagos is a cosmopolitan state. The Truth Value of this is ...

Answer: true

MCQ3: There are two types of statements:

Answer: simple and composite

MCQ4: The connective " $\wedge$ " in logic is a...

Answer: conjunction

MCQ5: The connective " $\Rightarrow$ " in logic is a...

Answer: conditional

MCQ6: The connective " $\sim$ " in logic is a...

Answer: negative

MCQ7: The connective " $\Leftrightarrow$ " in logic is a...

Answer: bi – implication

MCQ8: The negation of contradiction is a ...

Answer: tautology

MCQ9: ... is said to be formed when the conjunction of a set of simple mathematical statements gives rise to another mathematical statement.

Answer: argument

MCQ10: If $(p \wedge q) = p$ and $(p \vee q) = p$ implies an...

Answer: Idempotent Laws

MCQ11: If $(p \vee q) \vee r = p \vee (q \vee r)$ and $(p \wedge q) \wedge r = p \wedge (q \wedge r)$ implies an...

Answer: Associate Laws

MCQ12: If $(p \wedge q) = (q \wedge p)$ and $(p \vee q) = (q \vee p)$ implies an...

Answer: Commutative Laws

MCQ13: --- reads "the goods are standard and the goods are expensive"

Answer: $(p \wedge q)$

MCQ14: ... reads "the goods are standard if and only if the goods are expensive"

Answer: $(p \leftrightarrow q)$

MCQ15: ... is equivalent to $(p \vee q)$

Answer: $(p \leftrightarrow q)$

MCQ16: Which of the following statement is true

Answer: $(p \vee q) \wedge (p \vee r) = p \vee (q \wedge r)$

MCQ17: Which of the following statement is true

Answer: $(\sim (p \vee \sim q)) = \sim (p \wedge \sim q)$

MCQ18: is a rectangular array of numbers with reference to specific rules governing the array

Answer: Matrix

MCQ19: A matrix that has elements only on its diagonal is called

Answer: diagonal matrix

MCQ20: The ... of a matrix is the inter- changing of its row with the column.

Answer: transpose matrix

MCQ21: A matrix in which its transpose is equal to itself is called...

Answer: symmetric matrix

MCQ22: Given that $A = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 2 & 3 & 4 & 5 & 6 \end{bmatrix}$, Find AB ?

Answer: $\begin{bmatrix} 51 & 21 & 51 & 92 & 63 & 129 & 40 & 51 \end{bmatrix}$

MCQ23: Find the determinant of the $A = \begin{bmatrix} 2 & -4 & 5 & 6 \end{bmatrix}$?

Answer: 32

MCQ24: Given that $A = \begin{bmatrix} 1 & 2 & 3 & 3 & 2 & 1 & 1 & 3 & 2 \end{bmatrix}$, Find the determinant of A

Answer: 3

MCQ25: A matrix is said to be singular if the determinant is equal to

Answer: 0

MCQ26: Given that $13k4$ is a singular matrix. Find the value of k ?

Answer: 43

MCQ27: Given that $A = 201k23214$, what is the value of k , if A is said to be a singular matrix?

Answer: -6

MCQ28: Given that $x + 2y = 3$, $3x + 4y = 1$. What is x and y ?

Answer: -5, 4

MCQ29: Given that $x + 2y + 3z = 1$, $3x + 2y + z = 4$, $x + 3y + 2z = 0$. What is x, y and z ?

Answer: 74, -34, 14

MCQ30: Let $A = 123450214$, then the cofactor of matrix A is the matrix

Answer: 20-16-6-5-23-1512-3

MCQ31: What is the common difference in the sequence 3, 5, 7, 9, 11...

Answer: 2

MCQ32: Calculate the determinant of the matrix $A = 123450214$?

Answer: -10

MCQ33: Given the following equations for two related markets (A) and (B). Find the equilibrium conditions for each market. What is the equilibrium price for each market?
 $x_d(A) = 82 - 3P_A + P_B$, $x_d(B) = 92 + 2P_A - 4P_B$, $x_s(A) = -5 + 15P_A$, $x_s(A) = -6 + 32P_B$, where x_d and x_s denote quantity demanded and quantity supplied respectively.

Answer: $P_A = 5$, $P_B = 3$ are the equilibrium prices for each market

MCQ34: A necessary and sufficient condition for a matrix (square) A to be invertible is that

Answer: $A \neq 0$

MCQ35: What is the sum of $AB \rightarrow$, $-CB \rightarrow$, $CD \rightarrow$, $-ED \rightarrow$.

Answer: $AE \rightarrow$

MCQ35: The equation of a straight line at point and slope 5 is given by
the straight line given one point and slope 3 is

MCQ37: The equation of a line given two points
is given by

MCQ38: Obtain the equation of the line having points $A(-2, 3)$ and $B(4, -6)$

MCQ39: The equation of the line with points $A(-3, -2)$ and $B(-1, 0)$

MCQ40: The necessary and sufficient conditions for two lines to intersect are

Answer: they must be consistent and independent

MCQ41: Two lines are said to be parallel if

Answer: All the options

MCQ42: Find the coordinate of the point of intersection of the lines: $2x + 3y = 5$; $x + 2y = 3$

MCQ43: Find the coordinate of the point of intersection of the lines: $x + 2y = 5$; $x + y = 3$

Answer:

MCQ44: Find the coordinate of the point of intersection of the lines: $2x + y = 5$; $x + y = 3$

MCQ45: Let the gradient of a line be 3, find the equation of the line at point (1,2)

Answer: $y = 2x$

MCQ46: Find the equation of the line which is parallel to $3x + 2y = 5$ and passes through the point $(2, -4)$

Answer: $3x + 2y = -2$

MCQ47: Find the equation of the line which is parallel to $3x - 2y = 5$ and passes through the point $(-2, -4)$

Answer: $-3x + 2y = -2$

MCQ48: Find the equation of line that passes through the points: $A(2, 3)$ and $B(4, 6)$

Answer: $2y = 3x$

MCQ50: What is the gradient the line that passes through points $A(-3, -2)$ and $B(1, 0)$? MCQ1: ... is the study and analysis of a mathematical proposition as to ascertain the Truth Value of the proposition.

Answer: Logic

MCQ2: Lagos is a cosmopolitan state. The Truth Value of this is ...

Answer: true

MCQ3: There are two types of statements:

Answer: simple and composite

MCQ4: The connective " $\wedge$ " in logic is a...

Answer: conjunction

MCQ5: The connective " $\Rightarrow$ " in logic is a...

Answer: conditional

MCQ6: The connective " $\sim$ " in logic is a...

Answer: negative

MCQ7: The connective " $\Leftrightarrow$ " in logic is a...

Answer: bi-implication

MCQ8: The negation of contradiction is a ...

Answer: tautology

MCQ9: ... is said to be formed when the conjunction of a set of simple mathematical statements gives rise to another mathematical statement.

Answer: argument

MCQ10: If $(p \wedge q) = p$ and $(p \vee q) = p$ implies an...

Answer: Idempotent Laws

MCQ11: If $(p \vee q) \vee r = p \vee (q \vee r)$ and $(p \wedge q) \wedge r = p \wedge (q \wedge r)$ implies

Answer: Associate Laws

MCQ12: If $(p \wedge q) = (q \wedge p)$ and $(p \vee q) = (q \vee p)$ implies an...
Answer: Commutative Laws

MCQ13: --- reads “the goods are standard and the goods are expensive”
Answer: $(p \wedge q)$

MCQ14: ... reads “the goods are standard if and only if the goods are expensive”
Answer: $(p \leftrightarrow q)$

MCQ15: ... is equivalent to $(p \vee q)$
Answer: $(p \leftrightarrow q)$

MCQ16: Which of the following statement is true
Answer: $(p \vee q) \wedge (p \vee r) = p \vee (q \wedge r)$

MCQ17: Which of the following statement is true
Answer: $(\sim (p \vee \sim q)) = \sim (p \wedge \sim q)$

MCQ18: is a rectangular array of numbers with reference to specific rules governing the
array
Answer: Matrix

MCQ19: A matrix that has elements only on its diagonal is called
Answer: diagonal matrix

MCQ20: The ... of a matrix is the inter- changing of its row with the column.
Answer: transpose matrix

MCQ21: A matrix in which its transpose is equal to itself is called...
Answer: symmetric matrix

MCQ22: Given that $A = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 2 & 3 & 4 & 5 & 6 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 & 6 \\ 1 & 2 & 3 & 4 & 5 & 6 \end{pmatrix}$, Find AB ?
Answer: $\begin{pmatrix} 51 & 21 & 51 & 92 & 63 & 12 \\ 94 & 0 & 51 & 21 & 51 & 92 \end{pmatrix}$

MCQ23: Find the determinant of the $A = \begin{pmatrix} 2 & -4 & 5 & 6 \end{pmatrix}$?
Answer: 32

MCQ24: Given that $A = \begin{pmatrix} 1 & 2 & 3 & 3 & 2 & 1 & 1 & 3 & 2 \end{pmatrix}$, Find the determinant of A
Answer: 3

MCQ25: A matrix is said to be singular if the determinant is equal to
Answer: 0

MCQ26: Given that $\begin{pmatrix} 1 & 3 & k & 4 \end{pmatrix}$ is a singular matrix. Find the value of k ?
Answer: 43

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Answer: 74, -34, 14

MCQ30: Let $A = \begin{bmatrix} 12 & 34 & 50 & 21 & 4 \end{bmatrix}$, then the cofactor of matrix A is the matrix

Answer: $\begin{bmatrix} 20 & -16 & -6 & -5 & -23 & -15 & 12 & -3 \end{bmatrix}$

MCQ31: What is the common difference in the sequence 3, 5, 7, 9, 11...

Answer: 2

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