Mathematic model paper for interview

ALGEBRIC FORMULA

$(a+b)^2 = a^2 + 2ab + b^2$

$(a-b)^2 = a^2 - 2ab + b^2$

$(a+b)^3 = a^3 + 3ab(a+b) + b^3$

$(a-b)^3 = a^3 - 3ab(a-b) - b^3$

$a^3 + b^3 = (a+b)(a^2 - ab + b^2)$

$a^3 - b^3 = (a-b)(a^2 + ab + b^2)$

$a^2 - b^2 = (a+b)(a-b)$

TYPES OF MATRICES

1) EQUAL MATRIX

Let A and B two matrices . then A is said to be equal to B , A = B if and only if
The order of A = the order of B
There corresponding entries are equal
EXAMPLES

$A = \begin{bmatrix} 1 & 3 \\ -4 & 2 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 2+1 \\ -4 & 4-2 \end{bmatrix}$

2) ROW MATRIX

A matrix is called a row matrix if has only one row
EXAMPLE:

$A = \begin{bmatrix} 2 & -1 & 7 \end{bmatrix}$

3) COLUMN MATRIX

A matrix is called a column matrix if it has only one column

EXAMPLE $\quad A = \begin{bmatrix} 2 \\ 0 \\ 1 \end{bmatrix}$

4) SQUARE MATRIX

A matrix is called a square matrix number of rows is equal to its number columns
EXAMPLE

$A = \begin{bmatrix} 2 & -1 \\ 0 & 3 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 0 & -2 \\ 0 & 1 & 3 \end{bmatrix}$

5) NULL OR ZERO MATRIX

A matrix A is called null on zero matrix if each of its entries is 0
EXAMPLE

$A = \begin{bmatrix} 0 & 0 & 0 \\ 0 & 0 & 0 \end{bmatrix}$

6) TRANPOSE OF MATRIX

A matrix obtained by interchanging the row into columns or columns into rows of matrix is called transpose of a matrix it is denoted by A^t
EXAMPLE :

$A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 1 & 0 \\ -1 & 4 & -2 \end{bmatrix}$ The $A^t = \begin{bmatrix} 1 & 2 & -1 \\ 2 & 1 & 4 \\ 3 & 0 & -2 \end{bmatrix}$

7) DIAGONAL MATRIX

A square matrix A is called diagonal matrix if at least any one of the entries of its main are different and others are should be zero diagonal is not zero
EXAMPLE

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$$

8) SCALAR MATRIX

A diagonal matrix is called scalar is called scalar matrix , if all the main diagonal entries are same and others are zero.
EXAMPLE

$$A = \begin{bmatrix} 2 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 2 \end{bmatrix}$$

9) IDENTITY MATRIX

A diagonal matrix is called identity (unit) matrix if all diagonal entries are 1 and it is denoted by I

LOGARITHIM :

Find the value of x, if log 7^x = 2

Find the value of a , if $\log_a{}^{625} = 4$

Find the value of y , if $\log_{10}{}^{1000} = y$

SIMPLIFY

$$\left(\frac{p^a}{p^b} \right)^{a+b+c} \times \left(\frac{p^b}{p^c} \right)^{b+c-a} \times \left(\frac{p^c}{p^a} \right)^{a+c-b}$$
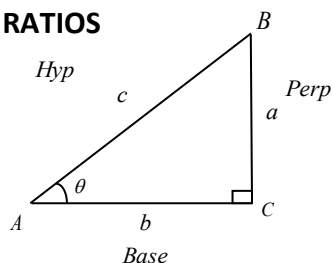
$$\left(\frac{x^p}{x^q} \right)^{-q-p} \times \left(\frac{x^m}{x^n} \right)^{m+n} \times \left(\frac{x^n}{x^l} \right)^{n+l}$$

TRIGONOMETRY:

The word trigonometry mean measurement of triangle.

1. TRIGONOMENTRIC RATIOS

EXAMPLE

$$A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

10) ADJOINT OF MATRIX

Adjoint of a square matrix $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}$ is obtained by interchanging the one diagonal entries and changing the sign of other entries . Adjoint of matrix A is denoted as adj A
EXAMPLE

$$AdjA = \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$

Inverse of a matrix using adjoint

$$A^{-1} = \frac{AdjA}{|A|}$$

$$Sin\theta = \frac{m\overline{BC}}{m\overline{AB}} = \frac{a}{c}$$

$$Cos\theta = \frac{m\overline{AC}}{m\overline{AB}} = \frac{b}{c}$$

$$\tan\theta = \frac{m\overline{BC}}{m\overline{AC}} = \frac{a}{b}$$

$$\text{Cotangent } \theta = \frac{m\overline{AC}}{m\overline{BC}} = \frac{b}{a}$$

$$Secant\theta = \frac{m\overline{AB}}{m\overline{AC}} = \frac{c}{b}$$

$$\text{Cosecant } \theta = \frac{m\overline{AB}}{m\overline{BC}} = \frac{c}{a}$$

$$Cos^2\theta + Sin^2\theta = 1$$

$$1 + Tan^2\theta = Sec^2\theta$$

2. TRIGONOMATRIC IDENTITES

FACTORIZATION:

Expression type: ac + bc + bd

$$3x\text{-}3a\text{+}xy\text{-}ay = \frac{c}{a} = \frac{c}{a}$$

Expression type : $a^2 \pm 2ab + b^2$

$$25x^2 + 16 + 40x$$

Expression type : $a^2 - b^2$

$$a^4 - b^4 \qquad\qquad a^8 - b^8$$

Expression type: $x^2 + px + q$

$$x^2 + 5x - 36$$
$$x^2 - 7x + 12$$

QUADRATIC EQUATION : $ax^2 + bx + c = 0$

Formula : $\qquad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Write each of the following numbers in scientific notation

30600   0.000058

NUMBER SYSTEMS:

NATURAL NUMBERS : The numbers 1,2,3- - - - - - - which we use for the counting certain objects are called natural numbers or positive integers

$$N = \{1,2,3 ---\}$$

WHOLE NUMBERS : If we include 0 in the set natural numbers the resulting set of whole numbers

$$W = \left\{0,1,2,3 ----\right\}$$

INTEGERS :

The set of integers consists of positive integers ,0 and negative integers it is denoted by z

$$Z = \{\cdots\cdots,3,-2,-1,0,1,2,3\}$$

RATIONAL NUMBERS

All numbers of the form $\dfrac{p}{q}$ where p and q are integers and q is not zero are called rational numbers

IRRATIONAL NUMBER

The numbers which cannot be expressed as a quotient of integers are called irrational number

EXAMPLES

The number $\sqrt{2}, \sqrt{3}, \sqrt{5}, \pi$ are irrational numbers