

① Sum & Avg of N Natural no's

② Fibonacci Series $\begin{matrix} 1 & 1 & 2 & 3 & 5 & 8 \\ + & & + & + & + & \end{matrix}$

8x4x7x2x7

20
23

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③ Factorial - $N! = N * I$ ($N=1$)

④ Pressure of ideal gas.

Matrix \rightarrow Print
 → Read ② Array ③ For loops ④ Read ⑤ Print ⑥ next ⑦ Put ⑧ Next ⑨ Back
 → For loop
 → Add → ① For A ≠ ② count ③ Put C(1,0)
 → M=R=N → ④ For loop Mat
 → Multiply ⑤ If A ≠ ⑥ count If N=R
 → C(1,0)=0 ⑦ For K=1 To N ⑧ count
 → C(1,0)+M(1,1)+M(2,2)
 → Transpose ⑨ If A ≠ ⑩ If K=N ⑪ For loop
 → Next , PRINT(C(1,0))

⑥ Soln of 2 simultaneous eqn

⑦ Count of Words. (contd) ; MBS \$(A1, I1)

⑧ Greater no.

⑨ No of times given letter appears

⑩ Quadratic eqn ⑪ Print AorBb... ⑫ Determinant (function defn)

⑬ Mean & STD

```

    CLS
    INPUT (NO OF DATA)
    DIM X(N)
    M=0, S=0, S=0, S=0
    FOR I=1 TO N
        READ X(I)
        M=M+X(I)
        S=S+(X(I)-M)^2
    NEXT I
    SD=SQR(S/N)
  
```

6 Method

2 - "Cr

L-LSC

2 - bubble sort

ASC DES

4 - Graphy

$f(a)*f(b) < 0$

4 + 2

↓ Brute

↓ Answer

↓ Roots

↓ Simplicity

↓ Brute

① DEF FNA
 ② INPUT Acc
 LOWERLIMIT : UPPERLIMIT
 ③ Z=0
 ④ IF FNA=0 : IF FNB=0
 ⑤ IF FNA+FNB > 0 "CHOOSE OTHER RANGE"
 ⑥ C=A+B/2
 . IF ABS((C-A)/Z)>N THEN PRINT C : PNT 2
 ⑦ IF FNA+FNB(A) < 0 THEN B=C ELSE A=C
 Z=Z+1
 GOTO

① DEF FNA
 ② DEF FND
 ③ NO. OF IT
 ④ Sqr Function
 ⑤ XN=0
 ⑥ FOR
 ⑦ XN=X-FNA/FND
 ⑧ X=XN
 ⑨ PRINT "ROOT AT NO OF ITERATION"; I; XN
 ⑩ IF ABS((XN-X)^2)>0.0001 THEN 10 : PRINT XN
 ⑪ NEXT I

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Exp-11 Page No. 13

AIM: To generate 10 random numbers b/w 0 and N
Take N as 20 or 50 or 100

CLS

RANDOMIZE

INPUT N

FOR I = 1 TO 50

Y = RND * N

Y = INT

PRINT Y

NEXT I

OUTPUT

Random Number seed (-32768 to 32768)? 101

? 50

29.38214

20.13815

21.23133

19.74317

3.208515

Modify

RANDOMIZE TIMER

OUTPUT ? 50

25.32933

4.922849

43.90849

40.61785

28.86541

AIM: Write a Program to generate 10 integers b/w 0 to N.

CLS

RANDOMIZE TIMER

INPUT N

FOR I = 1 TO 10

Y = RND * N

Y1 = INT(Y)

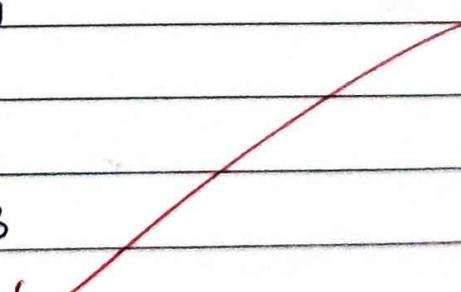
PRINT Y, Y1

NEXT I

OUTPUT

? 50

10.52457	10
4.054624	4
37.45066	37
17.17893	17
22.61998	22
19.29426	19
49.65413	49
19.30144	19
12.55372	12
23.08922	23



```
INPUT N  
S = 0  
AUG = 0  
FOR I = 1 TO N  
S = S + I  
NEXT I  
AUG = S / N  
PRINT S, AUG  
END
```

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FIBOSER

```
CLS
INPUT N
A = 1: B = 1
PRINT A, B,
FOR I = 3 TO N
C = A + B
PRINT C,
A = B: B = C
NEXT I
END
```

Immediate

<Shift+F1=Help> <F6=Window> <F2=Subs> <F5=Run>



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FACTORIA.BI

```
CLS
INPUT N
P = 1
FOR I = 1 TO N
P = P * I
NEXT I
PRINT P,
END
```

Immediate



<Shift+F1=Help> <F6=Window> <F2=Subs> <F5=Run> <

Write a program in BASIC to print the given name as initial of the first name : the name in a column.

```
10 REM TO PRINT NAME AND SURNAME
20 INPUT "NAME , SURNAME"; A$, B$
30 S$ = LEFT$(A$, 1)
40 PRINT S$ ; " ." ; B$
50 L = LEN(A$) : M = LEN(B$)
60 For I = 1 to L
70 X$ = MID$(A$, I, 1)
80 PRINT X$
90 NEXT I
100 FOR K = 1 to M
110 Y$ = MID$(B$, K, 1)
120 PRINT Y$
130 NEXT K
140 END
```

2/5

RUN ↴

NAME , SURNAME ? DIVYA, GUPTA

D . Gupta

D

Dr. Pragati Malik, Assistant Professor, University of Delhi

I

V

Y

A

G

To write a matrix.

CLS
 INPUT "ROW"; M ; "AND" COLUMN "
 INPUT "ROW"; R ; "AND" COLUMN"; S
 DIM A(M,M), B(R,S), C(M,S)

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Sumit Agarwal

CLS
 S=0 ~~DATA 10~~INPUT N
 FOR I=1 TO N

S=S+I

NEXT I

Avg = S/N

PRINT S, Avg.

END

~~Fibonacci
factorial~~

CLS ✓

LET A=1 : B=1

INPUT N ✓

PRINT A,B,

FOR I=3 TO N *

DATA 5,6,7,8

C=A+B

PRINT C
 A=B : B=C

NEXT I

END

~~factorial~~

CLS

INPUT N

P=1

FOR I=2 TO N

P=P*I

PRINT P

PRINT P,

END

CLS ✓

CLS

INPUT A,B,C

D=B*B - 2*A*C

R = -B / (2*A)

IF D=0 THEN

PRINT "ROOTS ARE REAL & EQUAL"

PRINT R,

IF D>0 THEN

PRINT "ROOTS ARE REAL."

R=SQR(D)/(2*A)

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PRINT " MATRIX A"

FOR I=1 TO M

FOR J=1 TO N

READ A(I,J);

PRINT A(I,J);

NEXT J

PRINT

NEXT I

DATA 1,2,3,4

PRINT "TRANSPOSE OF MATRIX"

FOR I=1 TO M

FOR J=1 TO N

C(I,J)=A(J,I)

PRINT C(I,J);

NEXT J

NEXT I

END

NEXT J

PRINT

NEXT I

DATA 5,6,7,8

PRINT " ADD OF MATRIX"

IF M=R AND N=S THEN 10 ELSE 20

10 FOR I=1 TO R

20 FOR I=1 TO R

C(I,J) = A(I,J) + B(I,J)

PRINT C(I,J);

NEXT J

PRINT

NEXT I

END

20 PRINT " MATRIX WANTS TO DO 12A"

END

PRINT "MULTIPLICATION"

IF M=R THEN 10 ELSE 20

10 FOR I=1 TO M

20 FOR I=1 TO M

FOR J=1 TO S

C(I,J)=0

FOR K=1 TO N

C(I,J)=C(I,J) + A(I,K)*B(K,J)

NEXT K

PRINT C(I,J),

NEXT J

PRINT

NEXT I

END

20 PRINT " MATRIX CAN'T BE MU

IF D<0 THEN

PRINT " ROOTS ARE IMAGINARY"

S = SQR(-D)/(2*A)

PRINT "REAL PART"; R; " AND "

IMAGINARY PART"; I

Aim: Write a program to find the no of times a given letter appears in a string / sentence.

```

10 CLS
20 INPUT "NO OF TIMES 'O' APPEARS IN A STRING"; A$
30 INPUT "ENTER THE LETTER>"; B$
40 L = LEN(A$)
50 X=0 : REM X IS THE NO OF TIMES THE LETTER APPEARS
60 FOR I=1 TO L
70 C$ = MID$(A$, I, 1)
80 IF C$ = B$ THEN
90 X = X + 1
100 NEXT I
110 PRINT "NO OF TIMES THE LETTER"; B$; "APPEARS IS"; X
120 END

```

OUTPUT

NO OF TIMES O APPEARS IN A STRING? OLD IS GOLD
ENTER THE LETTER? O

NO OF TIMES THE LETTER O APPEARS IS = 2

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Exp-15

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AIM: Write a Program in BASIC to find the number of words in a given string sentence.

```

10 CLS
20 INPUT "ENTER A SENTENCE: "; SENT$
30 WC = 1 : REM WC IS THE NUMBER OF WORDS
35 L = LEN(SENT$)
40 FOR I = 1 TO L
50 B$ = MID$(SENT$, I, 1)
55 IF B$ = " " THEN
60 WC = WC + 1
70 END IF
80 NEXT I
90 PRINT "TOTAL NUMBER OF WORDS ="; WC
100 END

```

OUTPUT

ENTER A SENTENCE :? MY NAME IS MEGHANA
 TOTAL NUMBER OF WORDS = 4.

Exp-16

AIM: WAP to find the roots of given quadratic equation.

$$ax^2 + bx + c = 0 \quad r_1 = \frac{-b + \sqrt{b^2 - 4ac}}{2a} \quad r_2 = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$$

```

10 CLS
20 REM " ROOTS OF QUADRATIC EQUATION "
30 INPUT "A,B,C IN EQUATION ax^2 + bx + c = 0 ARE "; A, B, C
40 D = B^2 - 4 * A * C
DELTASO 50 E = ABS(D); F = SQR(E)

```

```
INPUT "B"; B
INPUT "C"; C
D = B ^ 2 - 4 * A * C
R = -B / (2 * A)
IF D = 0 THEN
PRINT "ROOTS ARE EQUAL AND REAL"; R
ELSEIF D < 0 THEN
PRINT "ROOTS ARE IMAGINARY"
I = SQR(-D) / (2 * A)
PRINT "REAL PART"; R; "AND IMAGINARY PART"; I
PRINT R; "+i"; I
ELSEIF D > 0 THEN
R1 = SQR(D) / (2 * A)
ROOT1 = R + R1
ROOT2 = R - R1
PRINT ROOT1, ROOT2
END IF
END
```

Quadratic

2 5 8
3 6 9

Exp - 19

AIM- Write a Program in BASIC to print the capital and small alphabet.

```
10 CLS
20 A$ = "A": B$ = "a"
30 I = ASC(A$): J = ASC(B$)
40 X = 1
50 WHILE X <= 26
60 PRINT CHR$(I); CHR$(J); ";";
70 X = X + 1
80 I = I + 1: J = J + 1
90 WEND
100 END
```

Output

Aa, Bb, Cc, Dd, Ee, Ff, Gg, Hh, Ii, Jj, Kk, Ll, Mm, Nn,
Oo, Pp, Qq, Rr, Ss, Tt, Uu, Vv, Ww, Xx, Yy, Zz.

AIM: Write a program in BASIC to find the value of given determinant. The value of 3×3 determinant is -

$$\begin{vmatrix} A & B & C \\ D & E & F \\ G & H & I \end{vmatrix} = A * (E * I - H * F) - B * (D * I - G * F) + C * (D * H - G * E)$$

$$\text{FNA } (P, Q, R, S) = P * S - Q * R$$

or $\text{FNA } (E, F, H, I) = E * I - F * H \quad \checkmark$

```

10 CLS
20 DEF FNA (P,Q,R,S) = P*S - Q*R
30 INPUT "ENTER ELEMENTS OF 3X3 DETERMINANT"; A,B,C,
      D,E,F,G,H,I
40 DET = A * FNA (E,F,H,I) - B * FNA (D,F,G,I) + C * FNA
      (D,E,G,H)
50 PRINT DET
60 END
    
```

Output

ENTER ELEMENTS OF 3X3 DETERMINANT ? 2,3,5,6,8,8,5,6
 -70

```
CLS
INPUT "NO OF DATA TO BE INSERTED"; N
DIM X(N)
M = 0: SD = 0: S = 0: S1 = 0
FOR I = 1 TO N
READ X(I)
S = S + X(I)
NEXT I
M = S / N
FOR I = 1 TO N
S1 = S1 + (X(I) - M) ^ 2
NEXT I
SD = SQR(S1 / N)
PRINT M, SD
DATA 1.99,1.87,1.925,1.895,1.989
END
```

BINARYNS.BAS

```
CLS
DEF FNA (X) = X ^ 5 + 2 * X ^ 4 + 4 * X - 5
INPUT N: REM ACUURACY
INPUT A
INPUT B
Z = 0
IF FNA(A) = 0 THEN PRINT "ROOT": A
IF FNA(B) = 0 THEN PRINT "ROOT": B
IF FNA(A) * FNA(B) > 0 THEN PRINT "CHOOSE ANOTHER RANGE" ELSE GOTO 10
10 C = (A + B) / 2
20 IF ABS(C - A) < N THEN 50
IF FNA(C) * FNA(A) < 0 THEN B = C ELSE A = C
Z = Z + 1
GOTO 10
50 PRINT C: PRINT "NO. OF ITERATION": Z
END
```

Immediate

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DISSOCIA.BAS

```
CLS
DEF FNA (H)
DEF FND (H)
INPUT N
INPUT KA
INPUT CA
KW = 1E-14
H = SQR(KA * CA)
HN = 0
FOR I = 1 TO N
HN = H - FNA(H) / FND(H)
H = HN
PRINT "ROOT"
IF ABS(HN - H) > .000001 THEN 10_
NEXT I
PRINT H
PH = -LOG(HN) / LOG(10)
PRINT PH
```



Immediate

AIM: Write a Program in BASIC to solve numerically the exact expression for acid dissociation, to calculate the pH of a weak acid, by Newton-Raphson Method.

```

10 CLS
20 REM * PH OF WEAK ACID *
30 KW = 1E-14
40 INPUT "DISSOCIATION CONSTANT OF ACID"; KA
50 INPUT "INITIAL CONCENTRATION OF ACID"; CA
60 DEF FNA(N) = N^3 + KA * N^2 - (KW + KA * CA) * N - KA * KW
70 DEF FND(N) = 3 * N^2 + 2 * KA * N - (KW + KA * CA)
80 N = SQR(KA * CA)
90 FOR I = 1 TO 100
100 NO = N
110 Y = FNA(NO); D = FND(NO)
120 N = NO - Y/D
130 IF ABS((N-NO)/NO) < 0.00001 THEN 150
140 NEXT I
145 PRINT "VALUE HAVE NOT CONVERGED"; END
150 PRINT "CONC. OF H+ IS"; N
160 PH = -LOG(N)/LOG(10)
170 PRINT "PH OF ACID IS"; PH
180 END
    
```

Output

DISSOCIATION CONSTANT OF ACID ? 1.85E-5

INITIAL CONCENTRATION OF ACID ? 0.01

CONC. OF H+ IS ? 4.209657E-04

PH OF ACID IS ? 3.375753

A. Misra
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PRACTICE.BAS

```
10 CLS
DEF FNA (U) = U ^ 3 - .3664 * U ^ 2 + .03802 * U - .00121
DEF FND (U) = 3 * U ^ 2 - 2 * .3664 * U + .03802
INPUT U0
FOR I = 1 TO 100
U = U0
U = U0 - FNA(U) / FND(U)
IF ABS((U - U0) / U0) < .00001 THEN 20
NEXT I
20 PRINT "ROOT="; U
END
```



REGUFALS.BAS

```
CLS
INPUT N
INPUT A
INPUT B
DEF FNA (X) = X ^ 2 - 2
IF FNA(A) = 0 THEN PRINT "ROOT A"
IF FNA(B) = 0 THEN PRINT "ROOT B"
IF FNA(A) * FNA(B) > 0 THEN PRINT "NO ROOTS LIE"
FOR I = 1 TO N
X1 = (A * FNA(B) - B * FNA(A)) / (FNA(B) - FNA(A))
IF FNA(X1) * FNA(A) < 0 THEN B = X1 ELSE A = X1
PRINT "ROOT AT"; I; X1
NEXT I
PRINT X1
END
```

Exp-33

Write a Program in BASIC, to find roots of polynomial using Regula Falsi method. Eqⁿ - $x^3 + 3x - 5 = 0$

```

10 CLS
20 REM * REGULA FALSI METHOD *
30 INPUT "ENTER LOWER VALUE"; A
40 INPUT "ENTER HIGHER VALUE"; B
50 DEF FNA(X) = X^3 + 3*X - 5
60 FA = FNA(A); FB = FNA(B)
70 IF FA = 0 THEN PRINT "ROOT = "; A
80 IF FB = 0 THEN PRINT "ROOT = "; B
90 IF FA*FB > 0 THEN 100 ELSE 130
100 PRINT "NO ROOT IN THE RANGE"
110 PRINT "CHOOSE DIFFERENT RANGE"
120 GOTO 30
130 X1 = A - (B-A) * PA / (PB - FA)
140 Y1 = FNA(X1)
150 IF Y1 = 0 THEN 160
155 IF ABS(Y1) <= .001 THEN 160 ELSE 170
160 PRINT "ROOT = "; X1; END
170 IF Y1*FA > 0 THEN 180 ELSE 200
180 A = X1; FA = Y1
190 GOTO 130
200 B = X1; FB = Y1
210 GOTO 130
220 PRINT "ROOT = "; X3
230 END

```

OUTPUT:

ENTER LOWER VALUE? 1

ENTER HIGHER VALUE? 2

DELTA®

Root = 1.154079

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ITERUAND.BAS

```
CLS
DEF FNA (U) = N * R * T / (P + (A * N ^ 2) / (U ^ 2)) + N * B
T = 273: N = 1: P = 1: A = 1.5: B = .02: R = .0821
INPUT "NO. OF ITERATION": X
U0 = N * R * T / P
PRINT U0
FOR I = 1 TO X
U1 = FNA(U0)
U0 = U1
PRINT "ROOT AT": I; U1
NEXT I
IF ABS(U1 - U0) > .0001 THEN GOTO 10
10 PRINT U1
END
```

AIM: Write a program in BASIC to solve numerically
Mandrusat's equation of state using Iteration
Method: Take $P = 1 \text{ atm}$, $T = 273 \text{ K}$, $n = 1$, no. of
Iteration = 10, $K_a = 1.85 \times 10^{-5}$, $C_A = 0.01 \text{ M}$, $K_w = 1 \times 10^{-14}$.

```

10 CLS
20 REM * ITERATIVE METHOD FOR PH*
30 INPUT "DISSOCIATION CONSTANT OF ACID = "; KA
40 INPUT "INITIAL CONCENTRATION OF ACID = "; CA
50 INPUT "Kw = 1E-14"
60 INPUT "NO. OF ITERATIONS = "; M
70 H = SQR(KA * CA)
80 PRINT "INITIAL VALUE OF H = "; H
90 FOR I = 1 TO M
100 H1 = ((H^3 + KA * (H^2) + KA * Kw) / (Kw + KA + CA))
110 IF ABS((H1 - H) / H) < 0.00001 THEN 160
120 H = H1
130 NEXT I
140 PRINT "VALUES HAVE NOT CONVERGED"
150 GOTO 190
160 PRINT "THE CONC OF H+ IS = "; H1
170 PH = -LOG(H1) / LOG(10)
180 PRINT "PH OF ACID IS "; PH
190 END

```

Output

DISSOCIATION CONSTANT OF ACID = ? 1.85E-5

INITIAL CONCENTRATION OF ACID = ? 0.01

NO. OF ITERATIONS = ? 50

INITIAL VALUE OF H = ? 4.301163E-04

THE CONC OF H+ IS = ? 1.850034E-05

DELTA® PH OF ACID IS ? 4.732821

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TRAPZOID.BAS

```
CLS
DEF FNA (X) = X * LOG(1 + X)
INPUT A
INPUT B
INPUT N REM ITERATION_
S1 = 0
H = (B - A) / N
S = FNA(A) + FNA(B)
FOR I = 1 TO N - 1
S1 = S1 + FNA(A + I * H)
NEXT I
J = (H / 2) * (S + 2 * S1)
PRINT J
END
```

Exp-32

Write a Program in Basic to calculate the change in entropy 'S' of a substance over a given temp. range by the method of integration using the trapezoidal approximation. It is expressed in terms of the heat capacity at constant pressure as:-

$$\int_{S_1}^{S_2} dS = \int_{T_1}^{T_2} \frac{C_p}{T} dT$$

The heat capacity values at various temp. for CO are as follows:

T°C	0	10	20	30	40	50	60	70
Cp (J/mol)	28.912	28.902	29.118	29.151	29.184	29.299	29.361	29.392

```

10 CLS
20 REM * TRAPEZOIDAL APPROXIMATION*
30 INPUT "NO. OF DATA POINTS ="; N
40 DIM T(N), CP(N)
50 FOR I=1 TO N
60 READ T, CP(I)
70 T(I) = T + 273.15
80 NEXT I
90 DATA 0, 28.912, 10, 28.902, 20, 29.118, 30, 29.151, 40, 29.184,
      50, 29.299, 60, 29.361, 70, 29.392
100 S = CP(1) / T(1) + CP(N) / T(N)
110 FOR J=2 TO N-1
120 S = S + 2 * CP(J) / T(J)
130 NEXT I
140 DS = (10/2) * S
150 PRINT "ENTROPY CHANGE ="; DS
160 END

```

OUTPUT :

NO. OF DATA POINTS =? 8

ENTROPY CHANGE = 6.653048

DELTA®

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SIMPSONS.BAS

```
CLS
DEF FN(A) = X * LOG(1 + X)
INPUT A
INPUT B
INPUT N
SE = 0: SO = 0
H = (B - A) / N
S = FN(A) + FN(B)
FOR I = 1 TO N
IF I MOD 2 = 0 THEN SO = SO + FN(A + I * H) ELSE SE = SE + FN(A + I * H)
NEXT I
J = (H / 3) * (S + 2 * SE + 4 * SO)
PRINT J
END
```

Ex 30

Write a Program in BASIC to evaluate using Simpson's Rule, for the following integral and compare the result with the exact value $\frac{\sqrt{\pi}}{2}$.

$$I = \int_0^{\infty} e^{-x^2} dx$$

```
10 CLS
20 REM * SIMPSON'S RULE*
30 INPUT "LOWER LIMIT"; A
40 B=0 : I1=0 : I2=0
50 DEF FNA(X)=EXP(-X^2)
60 B=B+.1
70 H=(B-A)/2 : N=2
80 S=0 : S1=0
90 FOR J=1 TO N-1
100 IF INT(J/2)=J/2 THEN 110 ELSE 120
110 S=S+FNA(A+J*H) : GOTO 125
120 S1=S1+FNA(A+J*H)
125 NEXT J
130 DELTA® I=(H/3)*(FNA(A)+2*S+S1+FNA(B))
```

```

140 IF ABS ((I-I2)/I) <=.00001 THEN 180
150 I2=I
160 N=N/2 : N=N*2
170 GOTO 80
180 IF ABS ((I-I2)/I) <=.00001 THEN 200
190 I2=I : GOTO 60
200 PRINT "INTEGRAL"; I
210 E=SQR (3.14159)/2
220 PRINT "EXACT VALUE"; E
230 END

```

OUTPUT

LOWER LIMIT ? 0

INTEGRAL .8862216

EXACT VALUE .8862266

Exp - 32

The Maxwell-Boltzmann distribution function for the speed (v) of molecule is:

$$f(v)dv = \frac{4}{\sqrt{\pi}} e^{-\omega^2} \omega^2 d\omega$$

$$\omega = \sqrt{\frac{2RT}{M}}$$

T = Temp. of gas

M = molar mass

R = 8.314 J/K-mol

Write a Program in BASIC to evaluate fraction of oxygen molecules with speed b/w 200 and 400 m/s at 1000 K.

```

10 CLS
20 INPUT "MIN SPEED"; V1
30 INPUT "MAX SPEED"; V2
40 INPUT "TEMPERATURE"; T
50 R = 8.314 : M = .032
60 DEF FNA(W) = 4 / SQR(3.14) * EXP(-W*2) * W*2
70 W1 = V1 / SQR((2 * R + T) / M) : W2 = V2 / SQR((2 * R + T) / M)
80 N = 2
90 H = (W2 - W1) / 2
100 S = FNA(W1) + FNA(W2)
110 REM * LOWER LIMIT OF INTEGRAL IS W1, UPPER LIMIT IS W2 *
120 FOR J = 1 TO N-1
130 IF INT(J/2) = J/2 THEN 140 ELSE 150
140 S = S + 2 * FNA(W1 + J*H) : GOTO 160
150 S = S + 4 * FNA(W1 + J*H)
160 NEXT J
170 I = (H/3) * S
180 IF ABS(I - I1) <= .001 THEN 220
190 I1 = I
200 H = H/2 : N = 2 * N
210 GOTO 100
220 PRINT "FRACTION OF MOLECULE", I
230 END

```

OUTPUT

MIN SPEED? 200

MAX SPEED? 400

TEMPERATURE? 1000

FRACTION OF MOLECULE? 9.1879556-02

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```
130 LOCATE 5,10 : PRINT "PLOT OF PARTICLE IN A 1-D BOX AT  
    ENERGY LEVEL ="; N  
140 FOR X = 0 TO A STEP 0.01  
150 Y = YM * SIN (N * 3.14 * X / A)  
160 PSET (X,Y)  
170 NEXT X  
180 END
```

~~Mr. Mehta~~
03/04/2023

Exp - 38

Write a Program in BASIC to array the names in alphabetical order.

```
10 CLS  
20 REM * ALPHABETICAL ORDER BUBBLE SORT *  
30 INPUT "NO. OF STUDENTS"; A  
40 DIM N$(A)  
50 FOR I = 1 TO A  
60 INPUT "NAME OF STUDENTS"; N$(I)  
70 NEXT I  
80 PRINT "NAME IN ASCENDING ORDER"  
90 X = A - I  
100 FOR I = 1 TO A  
110 FOR J = 1 TO X  
120 IF N$(J) < N$(J+1) THEN 140 ELSE 130  
130 SWAP N$(J), N$(J+1)  
140 NEXT J  
150 X = X - 1  
160 NEXT I
```

DELTA®
100

170 FOR I = 1 TO A
180 PRINT N\$(I),
190 NEXT I
200 END

Output -

NO. OF STUDENTS ? 8

NAME OF STUDENTS ? RAM

NAME OF STUDENTS ? SITA

NAME OF STUDENTS ? GEETA

NAME OF STUDENTS ? PREETI

NAME OF STUDENTS ? SHYAM

NAME OF STUDENTS ? MEGH

NAME OF STUDENTS ? ADI

NAME OF STUDENTS ? SARI

NAME IN ASCENDING ORDER

ADI	GEETA	MEGH	PREETI	RAM
SARI	SHYAM	SITA		

Exp-39

Write a Program in BASIC to arrange names of fruit in alphabetical order.

10 CLS
20 REM "ALPHABETICAL ORDER BY 1ST METHOD"
30 INPUT "NO. OF STUDENTS"; A
40 DIM N\$(A)
50 FOR I = 1 TO A
60 READ N\$(I)
70 NEXT I

DELTAS

DATA MANGO, GUAVA, MELON, APPLE, GRAPES, ORANGE, BANANA

Write a Program to generate Prime no using MOD functions.

[PRIMENOS.BAS]

```
10 CLS
20 INPUT "ENTER VALUE = "; N
30 FOR I=1 TO N
40 C=0
50 FOR J=1 TO I
60 IF I MOD J=0 THEN C=C+1
70 NEXT J
80 IF C=2 THEN PRINT I
90 NEXT I
100 END
```

Exp-26

Write a program in BASIC to calculate pressure of a gas using -

- (i) ideal gas equation.
- (ii) van der waal's equation
- (iii) Dielectric equation.

[IDVADDIE.BAS]

CLS

REM * CALCULATE PRESSURE OF A GAS USING DIFFERENT EQUATIONS *

```
5 INPUT "ENTER 1 FOR IDEAL GAS, 2 FOR VDW GAS AND
3 FOR DIELECTRIC EQUATION "; M
```

R=8.314

```
INPUT "ENTER AMT OF GAS "; N
```

```
INPUT "ENTER VOLUME OF GAS "; V
```

```
INPUT "ENTER TEMP IN KELVIN "; T
```

```

REM FOR IDEAL GAS GOTO 10, FOR VDW GOTO 40, FOR
DIELECTRIC GOTO 80
ON M GOTO 10, 40, 80
10 P = (N * R + T) / V
20 PRINT " PRESSURE OF GAS "; P
30 GOTO 110
40 INPUT " ENTER VDW CONSTANTS A, B "; A, B
50 P = (N * R + T) / (V - N * B) - (A + N * A) / V * 2
60 PRINT " PRESSURE OF VDW GAS "; P
70 GOTO 120
80 INPUT " ENTER DIELECTRIC CONSTANT A, B "; A, B
90 P = (N * R + T / (V - B)) * EXP (A / (R + T * V))
100 PRINT " PRESSURE OF DIELECTRIC GAS = "; P
110 PRINT " DO YOU WANT TO CONTINUE "
120 INPUT " ENTER Y FOR YES "; Y$
130 IF Y$ = "Y" THEN 5
140 END
    
```

Output of Exp-25

ENTER VALUE =? 50

2	3	5	7	11
13	17	19	23	29
31	37	41	43	47

Output of Exp-26

ENTER 1 FOR IDEAL GAS, 2 FOR VDW GAS AND 3
 FOR DIELECTRIC EQUATION ? 1

ENTER AMT OF GAS ? 1

ENTER VOLUME OF GAS ? 24

ENTER TEMP. IN KELVIN ? 273

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Using Least Square method, WAP to determine Slope, intercept, std. deviation of slope and intercept, correlation coefficient and error parameter.

```

10 CLS
20 REM * LEAST SQUARE METHOD *
30 INPUT "ENTER NO. OF POINTS"; N
40 DIM X(100), Y(100)
50 S=0: S1=0: S2=0: F=0: G=0
60 FOR I=1 TO N
70 READ X(I), Y(I)
80 S=S+X(I): S1=S1+Y(I)
90 S2=S2+X(I)*Y(I)
100 F=F+X(I)*Y(I)^2: G=G+Y(I)^2
110 NEXT I
120 D=N*F-S^2
130 C=(S1*F-S*S1)*S/D
140 M=(N*S2-S*S1)/D
150 PRINT "INTERCEPT ="; C
160 PRINT "SLOPE ="; M
170 VARX=(F-(S^2/N))/(N-1)
180 VARY=(G-(S^2/N))/(N-1)
190 R=M*SQR(VARX/VARY)
200 E=SQR((1-R^2)/(N-2))/ABS(R)
210 SDM=E*M
220 SDC=SDM*SQR(G/N)
230 PRINT "COEFF. OF REGRESSION ="; R
240 PRINT "ERROR PARAMETER ="; E
250 PRINT "SD IN SLOPE ="; SDM
260 PRINT "SD IN INTERCEPT ="; SDC
270 DATA 1, 1.01, 2, 2.02, 3, 3.0, 4, 4.01, 5, 5.0, 6, 6.02, 7, 7.01,
DELTA® 8, 8.01

```

280 END

OUTPUT :

ENTER NO. OF POINTS ? 8

INTERCEPT = $1.000105E-02$

SLOPE = .9999998

COEFF. OF REGRESSION = .999995

ERROR PARAMETER = $1.291876E-03$

SD IN SLOPE = $1.291875E-03$

SD IN INTERCEPT = $6.535172E-03$

Exp - 29

Subroutine and Multiple Branching

the Binomial coefficient

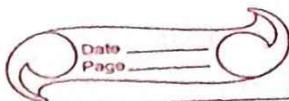
AIM - WAP in BASIC, to calculate $n! / r!(n-r)!$

```
10 CLS
20 REM * VALUE OF BINOMIAL COEFFICIENT *
30 INPUT "THE VALUE OF N"; N
40 INPUT "THE VALUE OF R"; R
50 P=N   (This statement assigns the value of N to dummy variable P)
60 GOSUB 500 (This statement takes the control to subroutine)
70 A=S   (" " names the value of S which is N!
80 P=R   (" " assigns the value of R to dummy variable P)
90 GOSUB 500
100 B=S  (This statement names the value of S which is R!
110 P=N-R. (" " assigns the value of N-R to dummy variable P)
120 GOSUB 500
130 C=S  (" " same the value of S which is (N-R)!)
140 MCR=A/(B*C)
150 PRINT "THE VALUE OF BINOMIAL coefficient IS"; MCR
160 END
```

```

500 S=1
510 IF P>34 THEN 560
520 FOR I=1 TO P
530 S=S*I
540 NEXT I
550 GOTOB 570
560 PRINT "THE VALUE IS OUT OF RANGE":END
570 RETURN

```



Q) Write a program in BASIC to calculate relative intensities of peaks of a proton obtained after spin-spin coupling with 4 equivalent neighbouring protons in a high resolution NMR spectrum.

Explain in SS

$$NC_m = \frac{n!}{m!(n-m)!}$$

n = no. of neighbouring protons, m goes from 0 to n

```

10CLS
20REM * RELATIVE INTENSITY OF PEAKS IN SPIN-SPIN COUPLING
   IN NMR*
30INPUT "NO. OF NEIGHBOURING PROTONS ="; N
40X=N: GOSUB 500
50NFAC=P
55PRINT "NO. OF PEAKS INTO WHICH THE SIGNAL SPLITS ="; N+1
60PRINT "RATIO OF INTENSITIES OF THE PEAK IS"
70FOR M=0 TO N
80I=M+1
90X=M: GOSUB 600
100MFAC=P
110X=N-M: GOSUB 500
120C(I)=NFAC/(MFAC*P)
130PRINT C(I);
140IF M=N THEN 160 ELSE 150
150PRINT ":";
160NEXT M
170END
500P=1
510FOR J=1 TO X
520P=P*J
530NEXT J
540RETURN

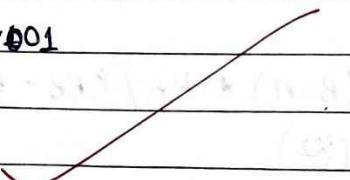
```

Exp - 34

Write a Program in basic to plot exponential curve in
 Graphics - $y = \exp(-a^2/b^2)$

```

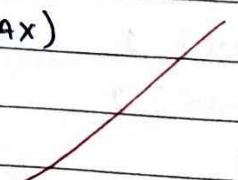
10 CLS
20 REM * EXPONENTIAL CURVES *
30 INPUT A,B,N
40 SCREEN 2 : CLS
50 VIEW (60,50) - (500,170)
60 WINDOW (0,0) - (N,1)
70 LINE (0,0) - (N,0)
80 LINE (0,10) - (0,1)
90 LOCATE 23,30 : PRINT "X-AXIS"
100 LOCATE 12,5 : PRINT "Y-AXIS"
110 LOCATE 2,20 : PRINT "PLOT OF EXPONENTIAL CURVE"
120 FOR X = 0.1 TO N STEP 0.001
130 Y = EXP(-A^2/(B*X))
140 PSET (X,Y)
150 NEXT X
160 END
  
```


Exp - 35

Write a Program in BASIC to plot cosine curve in
 Graphics . Eqn - $y = \cos x$

```

10 REM "PLOT COSINE CURVE"
20 CLS: SCREEN 2
30 YMAX = 2.1 : YMINT = -1.1
40 VIEW (100,60) - (500,170)
50 WINDOW (0,YMINT) - (360,YMAX)
60 LINE (0,0) - (360,0)
70 LINE (0,YMIN) - (0,YMAX)
  
```


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```

80 LOCATE 23,30 : PRINT "ANGLE IN DEGREE"
90 LOCATE 12,2 : PRINT "COS X"
100 LOCATE 2,20 : PRINT "PLOTTING COSINE CURVE"
110 FOR X=0 TO 360 STEP 1
120 Y = COS (3.14 * X / 180)
130 PSET (X,Y)
140 NEXT X
150 END

```

Exp - 36

Write a Program to plot Maxwell Boltzmann distribution curve for oxygen gas at two temperatures 300 K & 1000 K.

$$\frac{1}{N} \frac{dN}{du} = 4\pi \left(\frac{M}{2\pi RT} \right)^{3/2} \exp \left(-\frac{Mu^2}{2RT} \right) u^2$$

```

10 CLS
20 REM "PLOT MAXWELL BOLTZMANN DISTRIBUTION CURVE"
30 INPUT "ENTER NAME OF GAS"; G$
40 INPUT "ENTER MOLAR MASS IN KG/MOL"; M
50 INPUT "TEMPERATURES IN K"; T1, T2
60 R = 8.314 : PI = 3.14
70 IF T1 > T2 THEN T = T2 ELSE T = T1
80 DEF FNA (U) = 4 * PI * (M / (2 * PI * R * T)) ^ (3/2) * EXP (- (M * U^2) / (2 * R * T)) * (U^2)
90 UM = SQR (2 * R * T / M)
100 YM = FNA (UM)
110 SCREEN 2
120 VIEW (60, 50) - (500, 170)
130 WINDOW (0, 0) - (1500, YM)
DELTAT  LINE (0,0) - (1500, 0)

```

```

150 LINE (0,0)-(0,YMAX)
160 LOCATE 23,30: PRINT "VELOCITY IN M/S"
170 LOCATE 12,2: PRINT "Y-AXIS"
180 LOCATE 2,12: PRINT "PLOT OF MAXWELL BOLTZMANN DISTRIBUTION
CURVE FOR "; Q$; "AT TEMPERATURES"; T1; "AND"; T2
190 T=T1
200 FOR U=1 TO 1500
210 Y=FNA(U)
220 PSET (U,Y)
230 NEXT U
240 IF T=T2 THEN 260 ELSE 250
250 T=T2: GOTO 200
260 END

```

Exp-37

Write a Program in BASIC to plot the graph of particle in 1D box. $\psi = \sqrt{\frac{2}{a}} \sin\left(\frac{n\pi z}{a}\right)$

```

10 CLS
20 REM * PARTICLE IN A 1-D BOX *
30 INPUT "VALUE OF A"; A
40 INPUT "ENERGY LEVEL, N"; N
50 YM=SQR(2/A)
60 YMAX=YM+.1+YM
70 YMIN=-YM-.1+YM
80 CLS: SCREEN 2
90 VIEW(50,50)-(880,170)
100 WINDOW(0,YMIN)-(A,YMAX)
110 LINE(0,YMAX)-(0,YMIN)
DELTAt20 LINE(0,0)-(A,0)

```

- ① SUM & AVG
- ② Fibonacci $I=3 \text{ TO } N$
- ③ Factorial
- ④ Value of y
- ⑤ Name in col"
- ⑥ Add " of str.
- ⑦ P/V of saved got ✓
- ⑧ Print a MATRIX
- ⑨ ADD TWO MATRIX
- ⑩ MATRIX MULTIPLICATION
- ⑪ Transpose of matrix.
- ⑫ Sol' of 2 simultaneous eqn ✓
- ⑬ No of times letter appear $\text{lower} = 0$
- ⑭ T & P Interval 20 K ✓
- ⑮ Greatest of 3 no.'s ✓
- ⑯ No. of words $\text{word} = 1$
- ⑰ Quadratic Eqn
- ⑱ To print Capital & small
- ⑲ Determinant of Matrix
- ⑳ MEAN & SD.

