

## HP-38G

### Quadratic Formula Program

This program will display the solutions of a quadratic equation or the words "No Real Solution." To use the program, write the quadratic equation in general form and enter the values of  $a$ ,  $b$ , and  $c$ . This program displays the answer in complex form  $(x, y)$ , where  $x$  is the real part and  $y$  is the imaginary part.

```
QUADRAT PROGRAM
INPUT A;"AX2+BX+C=0";
"ENTER A";";1:
INPUT B;"AX2+BX+C=0";
"ENTER B";";1:
INPUT C;"AX2+BX+C=0";
"ENTER C";";1:
B2-4AC►D:
(-B+√D)/(2A)►Z1:
(-B+√D)/(2A)►Z2:
DISP 3;Z1:
DISP 5;Z2:
FREEZE
```

**Graph Reflection Program not available**

### Systems of Linear Equations Program

This program will display the solution of a system of two linear equations in two variables of the form

$$ax + by = c$$

$$dx + ey = f$$

if a unique solution exists.

1. Input the 2 programs SOLVE and SOLVE.SOLN.
2. Run the SOLVE program.

```
SOLVE
SOLVE PROGRAM
INPUT A;"AX+BY=C";
"ENTER A";";1:
INPUT B;"AX+BY=C";
"ENTER B";";1:
INPUT C;"AX+BY=C";
"ENTER C";";1:
INPUT D;"DX+EY=F";
"ENTER D";";1:
INPUT E;"DX+EY=F";
"ENTER E";";1:
INPUT F;"DX+EY=F";
"ENTER F";";1:
ERASE:
IF AE-DB==0
THEN DISP 3; "NO UNIQUE SOLUTION":
ELSE RUN "SOLVE.SOLN":
END:
FREEZE:
SOLVE.SOLN PROGRAM
(CE-BF)/(AE-DB)►X:
(AF-CD)/(AE-DB)►Y:
DISP 3;"X=X:
DISP 5;"Y=Y:
```

**Visualizing Row Operations Program not available**

## Evaluating an Algebraic Expression Program

This program can be used to evaluate an algebraic expression in one variable at several values of the variable. Use the Solve aplet to evaluate an expression.

1. Press **LIB**. Highlight the Solve aplet. Press **{{START}}**.
2. Set your expression equal to  $y$ , enter the equation ( $y = \text{your expression}$ ) in E1, and press **{{OK}}**. The equation should be checked.
3. Press **NUM**.
4. Highlight the  $x$ -variable field. Enter a value for  $x$  and press **{{OK}}**.
5. Highlight the  $y$ -variable field and press **{{SOLVE}}**. The value of the expression will appear in the  $y$ -variable field.
6. Repeat steps 4 and 5 to evaluate the expression for other values of  $x$ .

## Adding Vectors Graphically Program

This program will sketch two vectors in standard position. Using the parallelogram law for the vector addition, the program also sketches the vector sum. Be sure to set an appropriate viewing rectangle. The Function aplet should have a plot range of  $-10 \leq x \leq 10$  and  $-10 \leq y \leq 10$ .

```
ADDVECT PROGRAM
INPUT A;; "ENTER A";:1:
INPUT B;; "ENTER B";:1:
INPUT C;; "ENTER C";:1:
INPUT D;; "ENTER D";:1:
ERASE:
LINE -10;0;10;0:
LINE 0;-10;0;10:
LINE 0;0;A;B:
LINE 0;0;C;D:
FREEZE:
A+C▶E
B+D▶F
LINE 0;0;E;F:
LINE A;B;E;F:
LINE C;D;E;F:
FREEZE
```

## Graphing a Sine Function Program

This program will simultaneously draw a unit circle and the corresponding points on the sine curve. After the circle and sine curve are drawn, you can connect the points on the unit circle with their corresponding points on the sine curve by pressing **ENTER**.

1. Enter the 3 programs SINESHOW, DRAW.SINE, and DRAW.LINE.
2. Set the plot range in the Function aplet to  $-3 \leq x \leq \pi/2$  and  $-1.1 \leq y \leq 1.1$ . Set the angle measure to radians.
3. Run the SINESHOW program.

```
SINESHOW PROGRAM
ASIN(1)/(\pi/2)▶M:
0▶T:
-.25▶A:
0▶B:
0▶C:
LINE -3;0;\pi/2;0:
LINE 0;-1.1;0;1.1:
FOR T=0 TO 31\pi/15
  STEP \pi/15;
  RUN "DRAW.SINE":
END:
0▶T:
FOR T=0 TO 2\pi
  STEP \pi/6;
  RUN "DRAW.LINE":
END
```

```
DRAW.SINE PROGRAM
COS(MT)-1.25▶D:
T/4▶E:
SIN(MT)▶F:
LINE A;C;D;F:
LINE B;C;E;F:
D▶A:
E▶B:
F▶C:
```

```
DRAW.LINE PROGRAM
COS(MT)-1.25▶D:
T/4▶E:
SIN(MT)▶F:
LINE D;F;E;F:
FREEZE
```

## Finding the Angle Between Two Vectors Program

This program will sketch two vectors and calculate the measure of the angle between the vectors. Be sure to set an appropriate viewing rectangle. The Function applet should have a plot range of  $-10 \leq x \leq 10$  and  $-10 \leq y \leq 10$ . Set the MODE to degrees before running the program.

VECANGL PROGRAM

INPUT A; "ENTER (A,B)"; "ENTER A";;1:

INPUT B; "ENTER (A,B)"; "ENTER B";;1:

INPUT C; "ENTER (C,D)"; "ENTER C";;1:

INPUT D; "ENTER (C,D)"; "ENTER D";;1:

ERASE:

LINE-10;0;10;0:

LINE 0;-10;0;10:

LINE 0;0;A;B:

LINE 0;0;C;D:

FREEZE:

AC+BD►E

$\sqrt{A^2+B^2}$ ►U:

$\sqrt{C^2+D^2}$ ►V:

ACOS(E/(UV))►T:

ERASE:

DISP 3; "ANGLE = "T:

FREEZE