



```

[6] REM Quadratic Equation (Uses Square Root Function)
PRINT "Ax^2 + Bx + C = 0"
INPUT "A = ", A
INPUT "B = ", B
INPUT "C = ", C
D = B * B - 4 * A * C
IF D > 0 THEN
  DS = SQR(D)
  PRINT "REAL ROOTS:", (-B - D) / (2 * A), (-B + D) / (2 * A)
ELSE
  IF D = 0 THEN
    PRINT "DUPLICATE ROOT:", (-B) / (2 * A)
  ELSE
    DS = SQR(-D)
    PRINT "COMPLEX CONJUGATE ROOTS:", (-B / (2 * A)); "+/-"; DS / (2 * A); "i"
  END IF
END IF

```

### FOR ... NEXT, WHILE ... WEND - Loops

```

[7] FOR I = 3 TO 19 STEP 4 will output: 3
    PRINT I 7
NEXT 11
15
19

```

```

[8] TimeLeft% = 5 will output: 5
WHILE TimeLeft% >= 1 4
  PRINT TimeLeft% 3
  TimeLeft% = TimeLeft% - 1 2
WEND 1
PRINT "Blast Off" Blast Off

```

```

[9] PRINT "Press any key to continue ..." INKEY$ can be an keyboard value
WHILE INKEY$ = "" Program pauses until the keyboard
WEND is pressed.

```

```

[10] DO This will print the squares of
  INPUT "Type a number:", N numbers until 0 is entered.
  PRINT "The square of"; N; "is"; N*N
LOOP UNTIL N = 0

The output for both the above and
below situations is:

```

```

[11] N = 1 Type a number:5
DO WHILE N <> 0 The square of 5 is 25
  INPUT "Type a number:", N Type a number:0
  PRINT "The square of"; N "is"; N*N The square of 0 is 0
LOOP (the 0 case is also shown)

```

```

[12] N = INT(1 + 32 * RND)
PRINT "Guessing game for numbers"
PRINT "Guess a number from 1 to 32"
Count = 0
WHILE G <> N
    Count = Count + 1
    INPUT "Value :", G
    IF G < N THEN
        PRINT "Too Low"
    ELSEIF G > N THEN
        PRINT "Too High"
    ELSE
        PRINT "You Gussed It"
    END IF
WEND
PRINT "It took you"; Count; "guesses"

[13] REM ELEMENTARY STATISTICS
PRINT "N numbers - Find max, min, and mean"
INPUT "N = ", N
MAX = 1E-30
MIN = 1E+30
SUM = 0
FOR I = 1 TO N
    PRINT "#"; I;
    INPUT X
    IF X > MAX THEN MAX = X
    IF X < MIN THEN MIN = X
    SUM = SUM + X
NEXT
PRINT "Maximum =", MAX, "Minimum=", MIN
PRINT "Sum =", SUM, "Mean = ", SUM / N

[14] A combination example using a menu:

PRINT "Welcome to Bob's Restaurant"
PRINT
PRINT "Your menu is:"
PRINT "(1) Steak and Potatoes"; TAB(30); "$12.00"
PRINT "(2) Chicken and Broccoli"; TAB(32); "9.50"
PRINT "(3) Vegetarian Plate"; TAB(32); "6.00"
WHILE C% < 1 OR C% > 3
    INPUT "Choice:", C%
WEND
INPUT "Tip = $", TIP
SELECT CASE C%
CASE 1
    MealCost = 12
CASE 2
    MealCost = 9.5
CASE 3
    MealCost = 6
END SELECT
TotCost = MealCost * 1.07 + Tip
PRINT USING "Your total bill is $$###.##"; TotCost
PRINT "Thank you for dining at Bob's!"

```

Sample Output:

Welcome to Bob's Restaurant

```
Your menu is:
(1) Steak and Potatoes      $12.00
(2) Chicken and Broccoli    9.50
(3) Vegetarian Plate        6.00
Choice:2
Tip = $1.5
Your total bill is $11.67
Thank you for dining at Bob's!"
```

## PRINT USING - Formatted Output

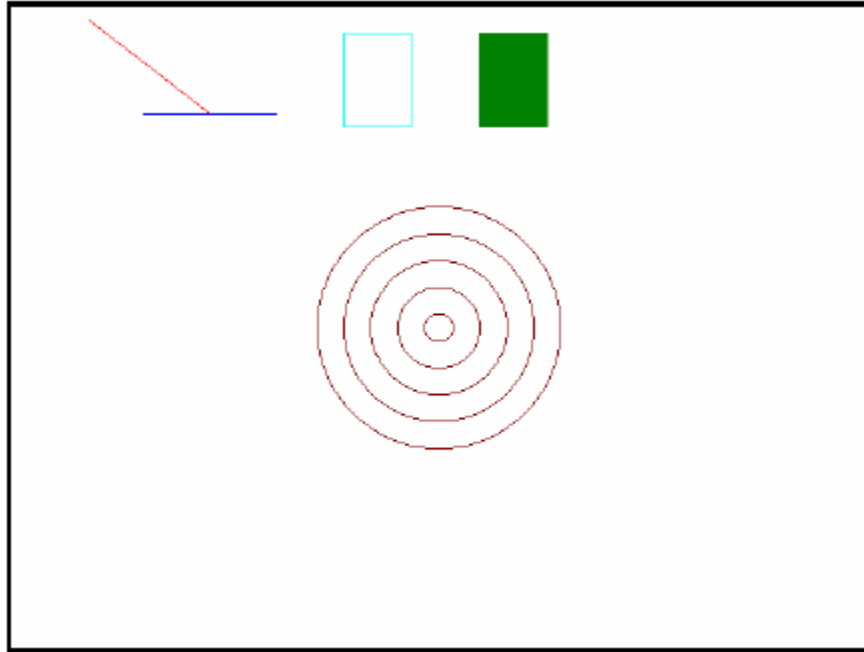
[15] Some uses of the PRINT & PRINT USING statements

```
PRINT "1234567890123456789012345678901234567890"
PRINT "Apple", 48.3, -12.9
PRINT "Apple"; TAB(12); "Juice"; TAB(20); 1.25
LET X = 98.76
Q$ = "QBasic"
PRINT USING "####"; X
PRINT USING "###.#"; X
PRINT USING "$$###.##"; X
PRINT USING "$$#,###.##"; 100 * X
PRINT USING "##.##^"^"; X
PRINT USING "\\ "; Q$           note: no spaces
PRINT "\ \ "; Q                note: two spaces
```

OUTPUT:

```
1234567890123456789012345678901234567890
Apple      48.3      -12.9   there is a space before the 4
Apple      Juice    1.25     there is a space before the 1
  99
  98.8     rounded to integer
  $98.76   rounded to 1 decimal place
  $9,876.00 to use commas (,) they must be given
  9.88E+01 scientific notation
QB        \\ takes two characters
QBas     now 4 characters are shown
```

## SCREEN, PSET, LINE, CIRCLE - Graphics



[16] The screen on the left was created in QBasic using the statements SCREEN, PSET, LINE, and CIRCLE.

The program is:

```
SCREEN 12
PSET (100, 80), 1
LINE -(200, 80), 1
LINE (60, 10)-(150, 80), 12
LINE (250, 20)-(300, 90), 11, B
LINE (350, 20)-(400, 90), 2, BF
FOR I = 10 TO 90 STEP 20
  CIRCLE (320, 240), I, 4
NEXT
WHILE INKEY$ = "": WEND
```

- SCREEN 12 sets the screen to a VGA 640 by 480 pixel size.
- PSET prints a point at 100 from the left and down 80 in blue.
- LINE - point: will connect from the current point to some other point.
- LINE point#1 - point #2: connects the two points with a line in magenta.
- B stands for box. The NW and SE corner are given and a box is shown in light cyan.
- BF stands for a box that is to be filled in. This box is shown in green.
- CIRCLE draws a circle with center at (320,240) which happens to be the center of the screen and with various radii. The effect will be a set of concentric circles in red as shown.
- The WHILE ... WEND with INKEY\$ was used to hold the screen in place until a key is pressed.

## ARRAYS - CARDS.BAS - Random Shuffle of N Cards

[17]

```
CLS
DIM S$(4), C$(13), X(52)
FOR I = 1 TO 4
  READ S$(I)
NEXT
FOR I=1 TO 13
  READ C$(I)
NEXT
FOR I=1 TO 52
  X(I) = 0
NEXT
DATA Clubs, Diamonds, Hearts, Spades
DATA Ace, 2, 3, 4, 5, 6, 7, 8, 9, 10, Jack, Queen, King
DO UNTIL N <= 52 AND N <> 0
  INPUT "How many cards do you want?", N
LOOP
FOR I = 1 TO N
  CN = INT(1 + 52 * RND)
  IF X(CN) = 1 THEN
    DO UNTIL X(CN) = 0
      CN = INT(1 + 52 * RND)
    LOOP
  END IF
  X(CN) = 1
  Suit = INT(1 + (CN - 1) / 13)
  Card = CN - 13 * (Suit - 1)
  PRINT "#"; I, C$(Card); " of "; S$(Suit)
NEXT
```

How many cards do you want?10

```
# 1 Jack of Hearts
# 2 2 of Hearts
# 3 5 of Hearts
# 4 3 of Diamonds
# 5 2 of Spades
# 6 Ace of Clubs
# 7 Ace of Spades
# 8 4 of Spades
# 9 3 of Clubs
# 10 9 of Diamonds
```

## STRING FUNCTIONS - CHRCOUNT.BAS - Counting characters in a sentence

```
[18] CLS
PRINT "Enter a word or sentence (don't use commas) :"
INPUT ", W$"
DIM F(27)
L = LEN(W$)
FOR I=1 TO L
  A$ = MID$(W$, I, 1) K = ASC(A$)
  IF K >= 65 AND K <= 90 THEN
    F(K - 64) = F(K - 64) + 1
  ELSE
    IF K >= 97 AND K <= 122 THEN
      F(K - 96) = F(K - 96) + 1
    ELSE
      F(27) = F(27) + 1
    END IF
  END IF
NEXT I
FOR J= 1 TO 26
  IF F(J) > 0 THEN
    PRINT "There are "; F(J); " of the letter "; CHR$(64 + J)
  END IF
NEXT J
PRINT "There are "; F(27); " spaces or other characters"
```

```
Enter a word or sentence (don't use commas) :
Welcome to Providence College.
There are 3 of the letter C
There are 1 of the letter D
There are 6 of the letter E
There are 1 of the letter G
There are 1 of the letter I
There are 3 of the letter L
There are 1 of the letter M
There are 1 of the letter N
There are 4 of the letter O
There are 1 of the letter P
There are 1 of the letter R
There are 1 of the letter T
There are 1 of the letter V
There are 1 of the letter W
There are 4 spaces or other characters
```