POINTS TO PONDER

6.1 This program is supposed to print $\sin(x)$ for $x=0$, 0.1, 0.2, ..., 1.0. It actually contains several errors similar to some discussed in this chapter. Find and fix them. Improve the style at the same time.

```
      X = 0.0
   10 SSIN = 0.0
      DO 20 I = 1, 100
      N = I - 1
      R = N
      TERM = -1.0**N*X**(2.0*R + 1.0)/(2.0*R+1.0)
      SSIN = SSIN + TERM
      IF (ABS(TERM) .LT. 0.00001) GO TO 30
   20 CONTINUE
   30 WRITE(6,40) X, SSIN
   40 FORMAT (F6.2, F14.8)
      X = X + 0.1
      IF (X .LE. 1.0) GO TO 10
      STOP
```

6.2 This program computes the mean of a set of numbers. The end of the data is marked by a card containing a number greater than or equal to 99999.

```
  100   FORMAT(5F15.5)
        SUM = 0.
        DO 3 N = 1,5000
        READ(2,100) X
        IF (X - 99999.)3,4,4
  3     SUM = SUM + X
  4     XNUM = N - 1
        XMEAN = SUM/XNUM
        WRITE(3,100)XMEAN
```

The program "works for any number of data items up to 5000." True or false? (Hint: Try a couple of boundary conditions.)

6.3 We observed that one should never test floating point numbers for exact equality. But here is one case where any rational person would believe that the comparison would work:

```
  95 N = N+1
     READ (5,100) DATA(N)
 100 FORMAT(F10.3)
     IF(DATA(N).NE.999.999) GO TO 95
```

If the input card contains 999.999 in the proper field, the program will stop reading, will it not? Try this case and similar ones on your system.

On some systems, the routines in the compiler that convert "999.999" into its internal (binary) representation were written by different people than those who wrote the routines that convert "999.999" when a READ is executed. Why are the routines not identical, since they perform the same function? (Answer: That is the