Pipe Flow Problem Solving Programs

Head Loss Equation: Outputs f

Program Name: DARCY
Disp "Re="
Input RE
Disp "e/D="
Input ED
If RE≤2300
Then
F=64/RE
Else
C1=6.9/RE+(ED^1.11)/3.7
F=1.6364/(ln C1)^2
End
Disp "f=",F

Flow Rate Problem: Outputs Q, V, Re, f

Program Name: SPEED
Disp "g=9.81/32.2"
Input G
Disp "L="
Input L
Disp "D="
Input D
Disp "e/D="
Input ED
Disp "hL="
Input HL
Disp "nu="
Input NU
C1=ED/3.7+((3.17*NU*NU*L/G/HL/D^3)^.5)
Q= -.965*(ln C1)*(G*HL/L*D^5)^.5
V=4*Q/D/D/π
RE=V*D/NU
C2=6.9/RE+((ED^1.11)/3.7)
F=1.6364/(ln C2)^2
Disp"Q=",Q
Pause
Disp "V=",V
Pause
Disp"Re=",RE
Pause
Disp "f=",F

Pipe Sizing Problem: Outputs D, Re, e/D, f

Program Name: SIZE
Disp "g=(m/s^2 or ft/s^2)"
Input G
Disp "L="
Input L
Disp "Q="
Input Q
Disp "e=(m/ft)"
Input E
Disp "hL="
Input HL
Disp "nu="
Input NU
C2=E^1.25
C3=((L*Q^2)/(G*HL))
C4=NU*(Q^(9.4))
C5=(L/(G*HL))^(5.2)
D=0.66*(C2*C3^(4.75)+(C4*C5))^(.04)
RE=4*Q/NU/D/π
ED=E/D
C1=6.9/RE+(ED^(1.11))/3.7
F=1.6364/(ln C1)^2
Disp "D=",D
Pause
Disp "Re=",RE
Pause
Disp "e/D=",ED
Pause
Disp "f=",F