#include <iostream>

#include <cmath>

#include <iomanip>

#include <cstdlib>

using namespace std;

bool isInt (double value) {

double dummy;

return bool(modf(value, &dummy) == 0);

}

double sqr(double value) { return value \* value; }

double A2(double a1, double b2 , double imin ){

double a2;

a2= ( (b2 - (a1\*( 0.23 + (b2/500))\*sqrt(1/imin)) ) / ( 1 - ((0.23 + (b2/500))\*sqrt(1/imin))));

return a2;

}

void printTable( double b1, double b2, double inc){

double a1, a2, sigma, i, y, imin, ymin;

ymin=0;

cout << endl;

cout << setw(10) << "Solidity" << setw(14) << "LHS Value" << endl;

cout << "----------------------------" << endl;

for ( i=0.6 ; i < 2.2 ; i+=0.1){

sigma=i;

y = 33.5291+((0.469188+0.0020961\*b2)\*b2)-b1+((0.187148\*b2-15.2599)\*log(1/sigma))-(0.677212\*sqr(log(1/sigma)));

cout << setiosflags(ios::fixed | ios::showpoint);

cout << setprecision(1)<< setw(7) << i << setprecision(4) << setw(15) << y << endl;

if ( ymin==0 || (fabs(y) < fabs(ymin)) ){

ymin=y;

imin=sigma;

}//endif

} // end for loop

a1=b1-inc;

a2= A2(a1, b2, imin);

cout << setprecision(1) << "Leaving function. The choosen value is " << imin << endl;

cout << endl;

cout << "Blade entry angle: " << a1 << endl;

cout << "Solidity: " << imin << endl;

cout << "blade exit angle: " << a2 << endl;

cout << endl;

}

int main () {

double b1, b2, b, inc;

for ( ; ; ) {

cout << setiosflags(ios::fixed | ios::showpoint);

cout << "Enter flow entry angle, flow exit angle, and incidence: ";

cin >> b1 >> b2 >> inc;

if ( b1==-1 && b2==-1 && inc==-1 ) {

break;

}// endif

b=(36-(0.45\*b2))/(b1-b2);

if ( !((b>=0.75 && b<=1.25) && ( b2>=(-10) && b2<=(50) ) && ( abs(inc)>=0 && abs(inc)<=3 ) && (b1!= b2) )) {

cout << "Invalid values ignored " << endl;

} else {

printTable(b1,b2,inc);

} //end if

}//end for loop

system("PAUSE");

return 0;

}