```sas
/* HW5 Question 3 */
options missing='M';
data milk;
infile "/courses/d452b5e5ba27fe300/HW3p3.txt";
input sales;
id = _n_;
run;

title 'Time Series Plot for Milk Sales';
proc sgplot data=milk;
series x=id y=sales;
run;

*proc print data=milk (firstobs=60 obs=70);
*run;

/* Create the extra five values for x1,
for the forecast purpose */
title 'Created Intervention';
data milk;
set milk;
if id = 63 then x1=1;
else x1=0;
proc print data=milk (firstobs=60 obs=70);
run;

data extra;
input sales id x1;
cards;
'M' 79 0
'M' 80 0
'M' 81 0
'M' 82 0
'M' 83 0
;
run;
title 'Created Extra Five Rows';
proc append base=milk data=extra;
proc print data=milk (firstobs=75);
run;


title 'Intervention Analysis';
proc arima data=milk;
identify var=sales cross=x1;
estimate p=1 input = ( (1,2,3,4,5,6,7,8,9,10) x1) method=ml outest=est1;
run;

*proc print data=est1;
*run;
```

```sas
52 proc transpose data=est1 out=est2;
53 *proc print data=est2;
54 run;
55
56 data ltf;
57 set est2;
58 if  _n_ > 3;
59 Weight=COL1;
60 LB=-2*COL2;
61 UB=2*COL2;
62 Lag=COL4;
63 keep Weight Lag LB UB;
64 if _n_ > 4 then Weight=-Weight;
65 run;
66
67 title 'v-Weights plot';
68 proc sgplot data=ltf;
69 vbar Lag /response=Weight;
70 vline Lag /response = LB;
71 vline Lag /response = UB;
72 run;
73 * b = 0, r = 1, u = 1, h = 1;
74
75 title 'Intervention Analysis';
76 proc arima data=milk;
77 identify var=sales cross=x1 noprint nlag=40;
78 estimate input = ( (1)/(1) x1) method=ml;
79 *estimate p=(1)(12) q=2 input = ( (1)/(1) x1) method=ml;
80 estimate p=(1)(12) q=(2) input = ( (1)/(1) x1) method=ml;
81 forecast back=0 lead=5 out=res;
82 run;
83
84 data res;
85 set res;
86 set milk;
87 run;
88
89 title 'Residual Plot';
90 proc sgplot data=res;
91 series x=id y=residual;
92 run;
93
94 title 'Forecast Results';
95 proc sgplot data=res;
96 band x=id lower=L95 upper=U95;
97 series x=id y=sales;
98 series x=id y=forecast;
99 run;
```