

■ Example 9.1 - Math Programming

```
Off[General::spell];
Off[General::spell1];
thinn = AbsoluteThickness[.5];
medum = AbsoluteThickness[1.];
thick = AbsoluteThickness[1.5];
$TextStyle = {FontFamily -> "Helvetica", FontSlant -> "Plain", FontSize -> 9};
SetOptions[ListPlot, AxesStyle -> medum, PlotStyle -> medum, ImageSize -> 384];
Black = GrayLevel[0];
BGray = GrayLevel[0.3];
WGray = GrayLevel[0.6];
```

■ Linear Programming (&Figure 9.3)

■ Primal Problem - Priced Water

```
p = 27.4;
c = {-100., -90., -75., -70., -50., p};
m =  $\begin{pmatrix} 1. & 1. & 1. & 1. & 1. & 0. \\ 4. & 3.4 & 2.7 & 2.6 & 1.6 & -1. \\ 0 & 0 & 0 & -1. & 1. & 0. \end{pmatrix}$ ;
b =  $\begin{pmatrix} 1000. & -1 \\ 0. & 0 \\ 0. & 0 \end{pmatrix}$ ;
ans = LinearProgramming[c, m, b]
profit = -c.ans
{0., 0., 0., 500., 500., 2100.}
2460.
```

■ Primal Problem - Water Constraint

```
ws = 2200.;
c = {-100., -90., -75., -70., -50.};
m =  $\begin{pmatrix} 1. & 1. & 1. & 1. & 1. \\ 4. & 3.4 & 2.7 & 2.6 & 1.6 \\ 0 & 0 & 0 & -1. & 1. \end{pmatrix}$ ;
b =  $\begin{pmatrix} 1000. & -1 \\ ws & -1 \\ 0 & -1 \end{pmatrix}$ ;
LinearProgramming[c, m, b]
-c.%
{0., 0., 166.667, 416.667, 416.667}
62500.
```

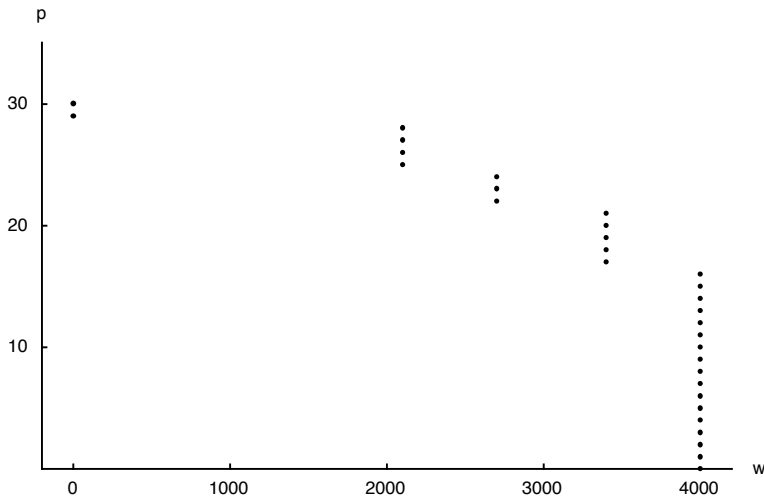
■ Looping with "Table" command over a Range of Prices to Build the Demand Function

```

p = .;
c = {-100., -90., -75., -70., -50., p};
m =  $\begin{pmatrix} 1. & 1. & 1. & 1. & 1. & 0. \\ 4. & 3.4 & 2.7 & 2.6 & 1.6 & -1. \\ 0 & 0 & 0 & -1. & 1. & 0. \end{pmatrix}$ ;
b =  $\begin{pmatrix} 1000. & -1 \\ 0. & 0 \\ 0. & 0 \end{pmatrix}$ ;
dpoint[p_] := {Drop[LinearProgramming[c, m, b], 5], p}
allpoints = Table[Flatten[dpoint[p]], {p, 0, 30, 1.}];

pl93 = ListPlot[allpoints, AxesLabel → {w, p},
  PlotRange → {{-200, 4200}, {0, 35}},
  AxesOrigin → {-200, 0},
  Ticks →
  {{{0, 0}, {0.00625, 0.}, {Black, medum}}, {1000, 1000, {0.00625, 0.}, {Black, medum}},
  {2000, 2000, {0.00625, 0.}, {Black, medum}}, {3000, 3000, {0.00625, 0.},
  {Black, medum}}, {4000, 4000, {0.00000, 0.}, {Black, thinn}}},
  {{10, 10, {0.00625, 0.}, {Black, medum}}, {20, 20, {0.00625, 0.}, {Black, medum}},
  {30, 30, {0.00625, 0.}, {Black, medum}}}]

```



- Graphics -