In[372]:=
```
Clear["Global`*"];
```

In[373]:=
```
input = Import["C:\\Users\\DreadKnight\\Desktop\\LiftData.csv"];
```

In[374]:=
```
pAccIx = {778, 781};
pConstIx = {802, 827};
pDecIx = {837, 842};

nAccIx = {1086, 1090};
nConstIx = {1104, 1139};
nDecIx = {1151, 1155};
```

In[380]:=
```
vModel = v t + x;
aModel = ka t^2 + v t + x;
```

In[382]:=
```
pAccData = input[[pAccIx[[1]] ;; pAccIx[[2]]]];
pConstData = input[[pConstIx[[1]] ;; pConstIx[[2]]]];
pDecData = input[[pDecIx[[1]] ;; pDecIx[[2]]]];

nAccData = input[[nAccIx[[1]] ;; nAccIx[[2]]]];
nConstData = input[[nConstIx[[1]] ;; nConstIx[[2]]]];
nDecData = input[[nDecIx[[1]] ;; nDecIx[[2]]]];
```

In[388]:=
```
labels = {
    "pAccLeft",
    "pAccRight",
    "pConstLeft",
    "pConstRight",
    "pDecLeft",
    "pDecRight",
    "nAccLeft",
    "nAccRight",
    "nConstLeft",
    "nConstRight",
    "nDecLeft",
    "nDecRight",
   };
```

In[389]:=
```
data = {};

subLeft = {};
subRight = {};
For[i = 1, i <= Length[pAccData], i++,
 subLeft = Append[subLeft, {pAccData[[i]][[1]], pAccData[[i]][[2]]}];
 subRight = Append[subRight, {pAccData[[i]][[1]], pAccData[[i]][[3]]}];
]
data = Append[data, subLeft];
data = Append[data, subRight];

subLeft = {};
subRight = {};
For[i = 1, i <= Length[pConstData], i++,
```

```
 subLeft = Append[subLeft, {pConstData[[i]][[1]], pConstData[[i]][[2]]}];
 subRight = Append[subRight, {pConstData[[i]][[1]], pConstData[[i]][[3]]}];
]
data = Append[data, subLeft];
data = Append[data, subRight];

subLeft = {};
subRight = {};
For[i = 1, i <= Length[pDecData], i++,
 subLeft = Append[subLeft, {pDecData[[i]][[1]], pDecData[[i]][[2]]}];
 subRight = Append[subRight, {pDecData[[i]][[1]], pDecData[[i]][[3]]}];
]
data = Append[data, subLeft];
data = Append[data, subRight];

subLeft = {};
subRight = {};
For[i = 1, i <= Length[nAccData], i++,
 subLeft = Append[subLeft, {nAccData[[i]][[1]], nAccData[[i]][[2]]}];
 subRight = Append[subRight, {nAccData[[i]][[1]], nAccData[[i]][[3]]}];
]
data = Append[data, subLeft];
data = Append[data, subRight];

subLeft = {};
subRight = {};
For[i = 1, i <= Length[nConstData], i++,
 subLeft = Append[subLeft, {nConstData[[i]][[1]], nConstData[[i]][[2]]}];
 subRight = Append[subRight, {nConstData[[i]][[1]], nConstData[[i]][[3]]}];
]
data = Append[data, subLeft];
data = Append[data, subRight];

subLeft = {};
subRight = {};
For[i = 1, i <= Length[nDecData], i++,
 subLeft = Append[subLeft, {nDecData[[i]][[1]], nDecData[[i]][[2]]}];
 subRight = Append[subRight, {nDecData[[i]][[1]], nDecData[[i]][[3]]}];
]
data = Append[data, subLeft];
data = Append[data, subRight];
```

In[420]:=
```
fitList = {};

For[i = 1, i <= Length[data], i++,
 useA = ! (i == 3 || i == 4 || i == 9 || i == 10);
 fitList = Append[fitList,
   NonlinearModelFit[
    data[[i]],
    If[useA, aModel, vModel],
    If[useA, {x, v, ka}, {x, v}],
    t
   ]
  ];
]
```

In[422]:=
```
Length[fitList]
```

Out[422]= 12

****

Note that ka in the parameter table is equal to (1/2) * acceleration.

So a = 2 * ka.

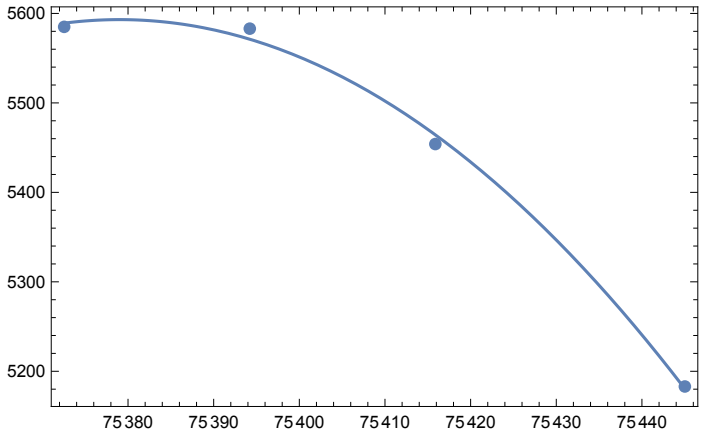
Also,

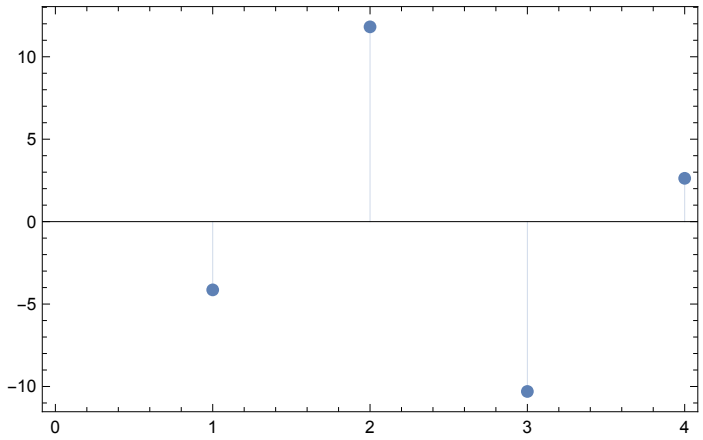
x is in counts
v is in counts / ms
ka is in counts/ ms^2

****

In[424]:=
```
For[i = 1, i <= Length[fitList], i++,
 d = data[[i]];
 Print[labels[[i]]];
 Print[Show[ListPlot[data[[i]]],
   Plot[fitList[[i]][t], {t, d[[1]][[1]], d[[Length[d]]][[1]]}], Frame → True]];
 Print[ListPlot[fitList[[i]]["FitResiduals"], Filling → Axis, Frame → True]];
 Print[fitList[[i]]["ParameterTable"]];
 Print[];
]
```

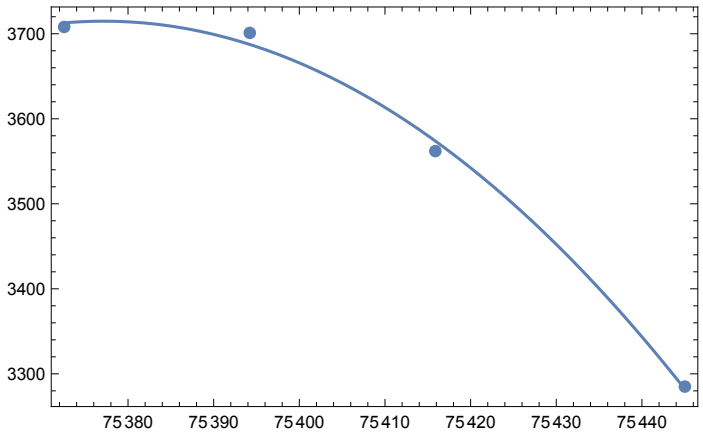
pAccLeft

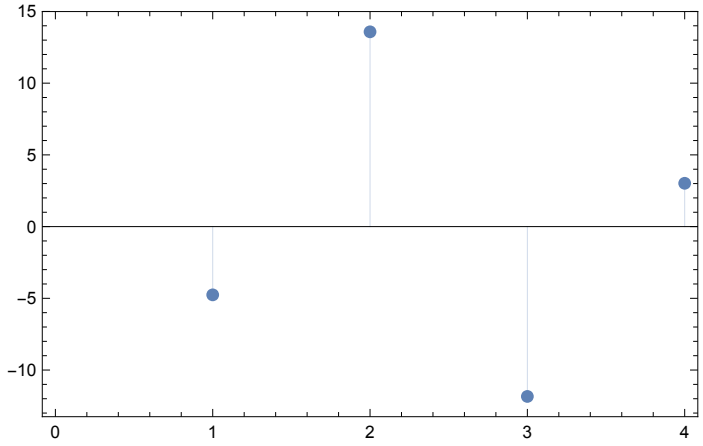




	Estimate	Standard Error	t- Statistic	P- Value
x	-5.38267×10^{8}	8.1245×10^{-6}	-6.62523×10^{13}	9.60902×10^{-15}
v	14 281.8	0.306331	46 621.9	0.0000136549
ka	−0.094733	4.06238×10^{-6}	−23 319.6	0.0000272998

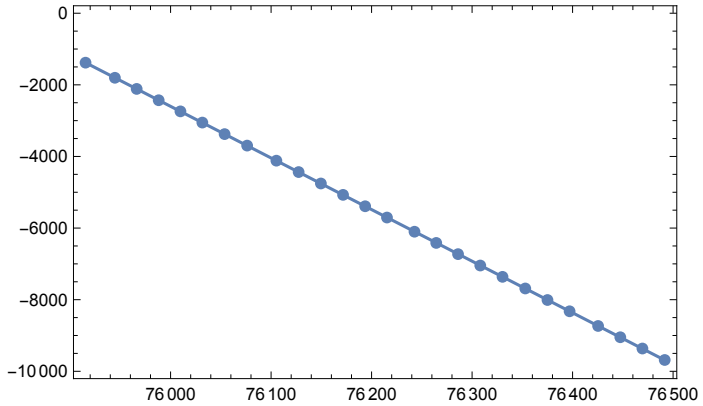
pAccRight

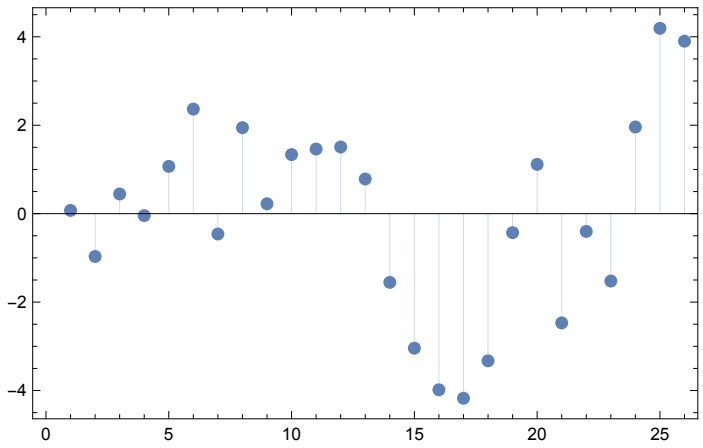




	Estimate	Standard Error	t- Statistic	P- Value
x	-5.34111×10^{8}	9.33771×10^{-6}	-5.71994×10^{13}	1.11298×10^{-14}
v	14 171.8	0.352075	40 252.3	0.0000158157
ka	−0.094006	4.66899×10^{-6}	−20 134.1	0.000031619

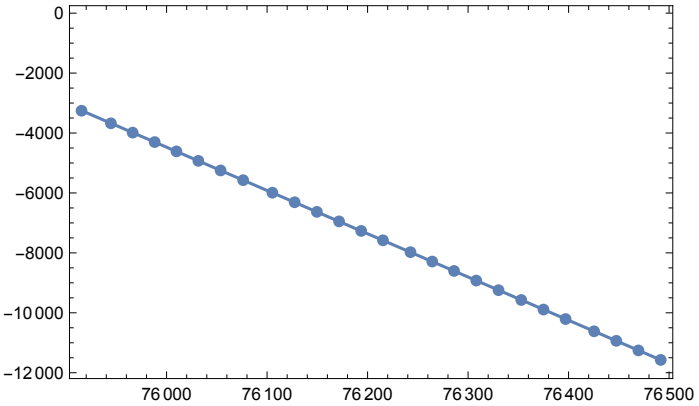
pConstLeft

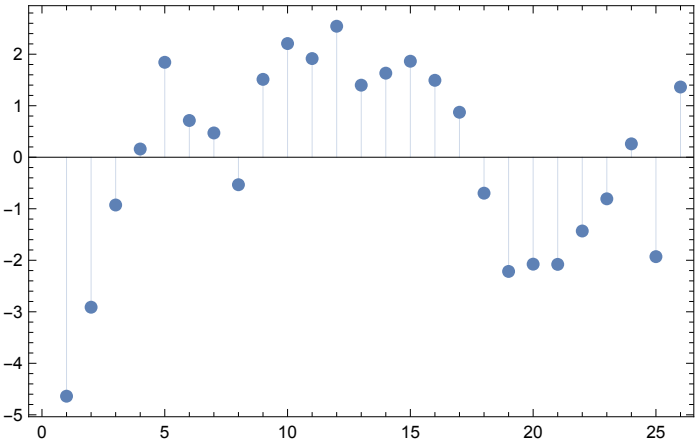




	Estimate	Standard Error	t- Statistic	P- Value
x	1.09288×10^{6}	195.492	5590.41	6.7796×10^{-75}
v	−14.4142	0.00256532	−5618.86	6.00175×10^{-75}

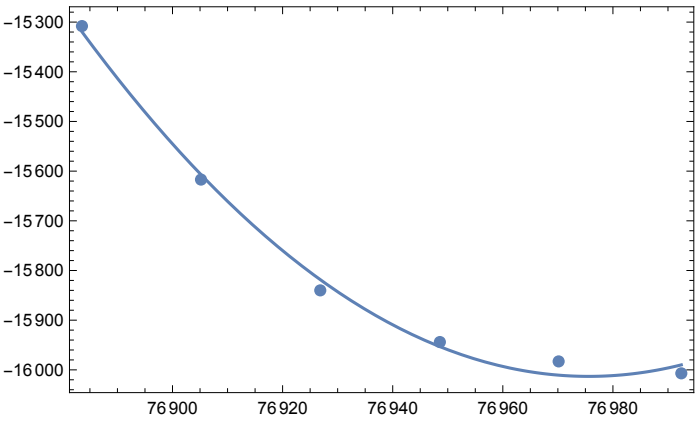
pConstRight

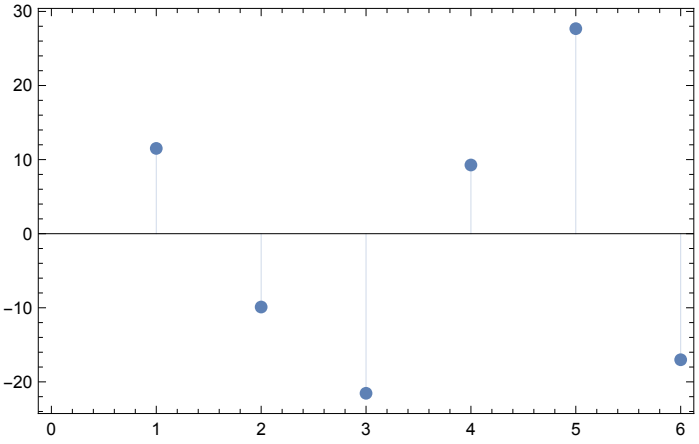




	Estimate	Standard Error	t- Statistic	P- Value
x	1.09301×10^{6}	164.575	6641.4	1.08545×10^{-76}
v	−14.4405	0.00215962	−6686.62	9.2233×10^{-77}

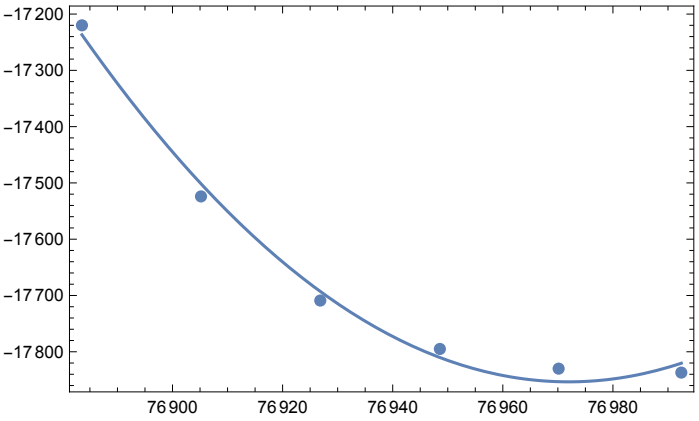
pDecLeft

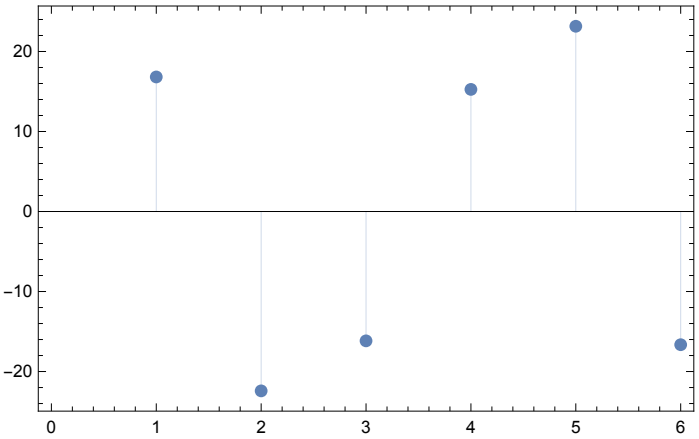




	Estimate	Standard Error	t- Statistic	P- Value
x	4.84982×10^{8}	7.0704×10^{-6}	6.85932×10^{13}	6.83324×10^{-42}
v	−12 601.3	0.271991	−46 329.9	2.21761×10^{-14}
ka	0.0818528	3.53521×10^{-6}	23 153.6	1.77671×10^{-13}

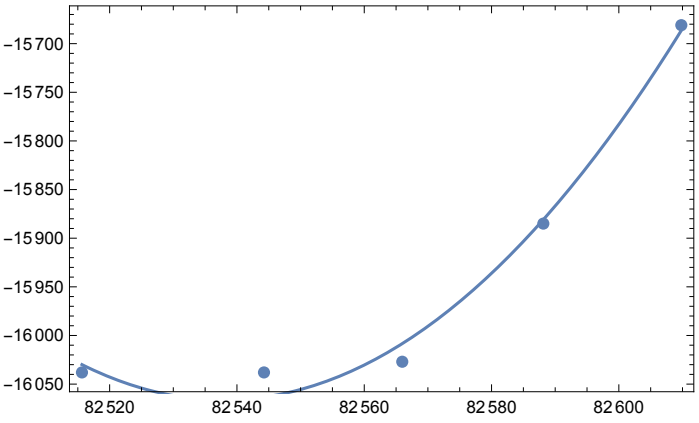
pDecRight

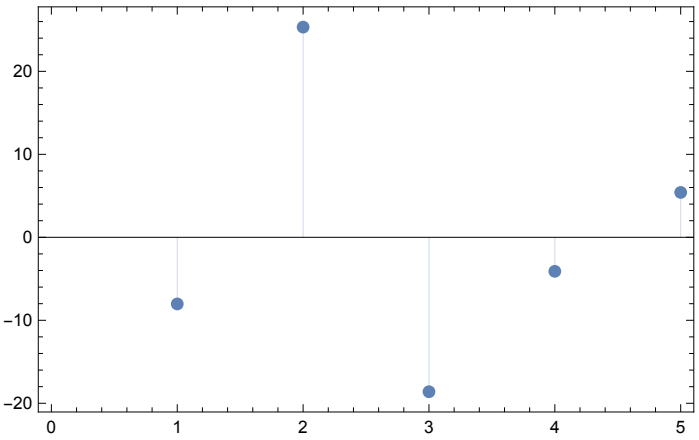




	Estimate	Standard Error	t- Statistic	P- Value
x	4.67481×10^{8}	7.54896×10^{-6}	6.19266×10^{13}	9.28622×10^{-42}
v	−12 147.3	0.290401	−41 829.3	3.01321×10^{-14}
ka	0.0789071	3.77449×10^{-6}	20 905.4	2.41378×10^{-13}

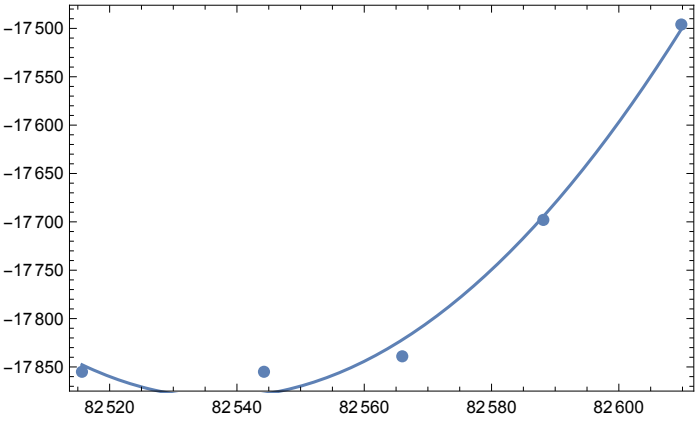
nAccLeft

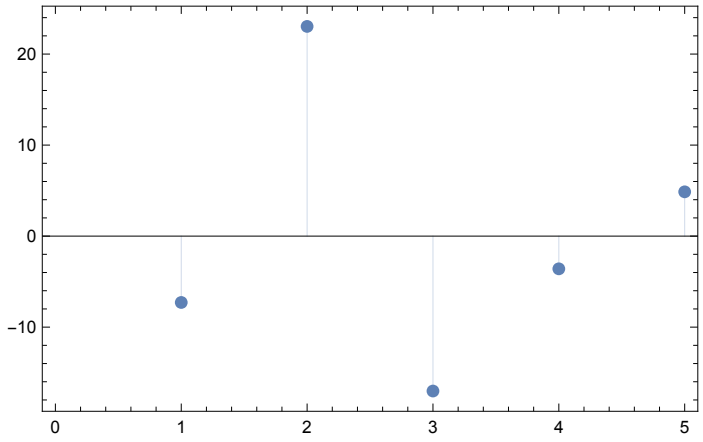




	Estimate	Standard Error	t- Statistic	P- Value
x	5.00311×10^{8}	7.71896×10^{-6}	6.48158×10^{13}	0.
v	−12 123.6	0.318649	−38 046.8	6.90818×10^{-10}
ka	0.0734424	3.85938×10^{-6}	19 029.6	2.76147×10^{-9}

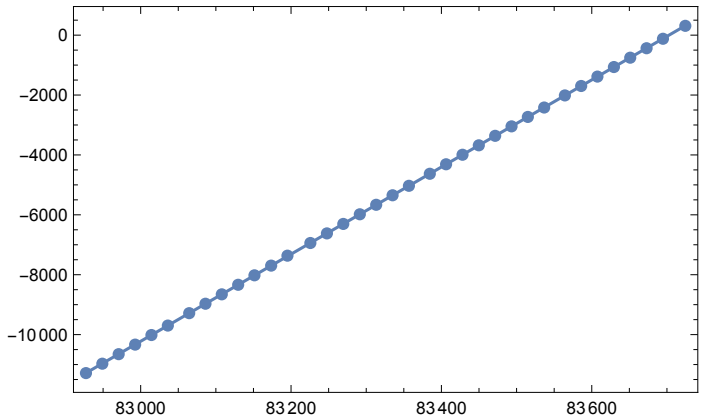
nAccRight

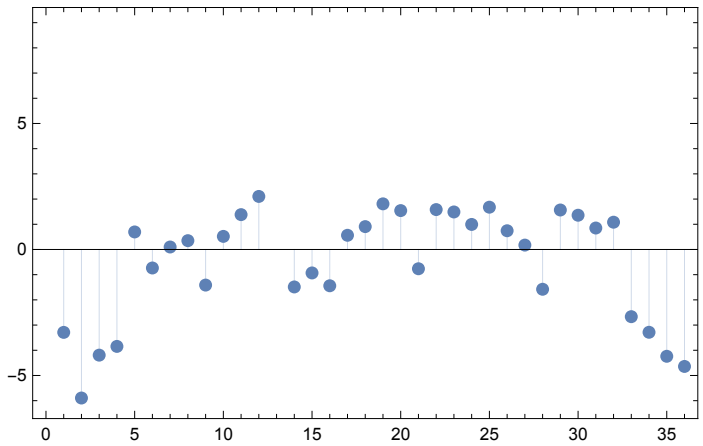




	Estimate	Standard Error	t- Statistic	P- Value
x	4.92898×10^{8}	7.02604×10^{-6}	7.01531×10^{13}	0.
v	−11 944.1	0.290044	−41 180.3	5.89687×10^{-10}
ka	0.0723557	3.51293×10^{-6}	20 597.	2.35718×10^{-9}

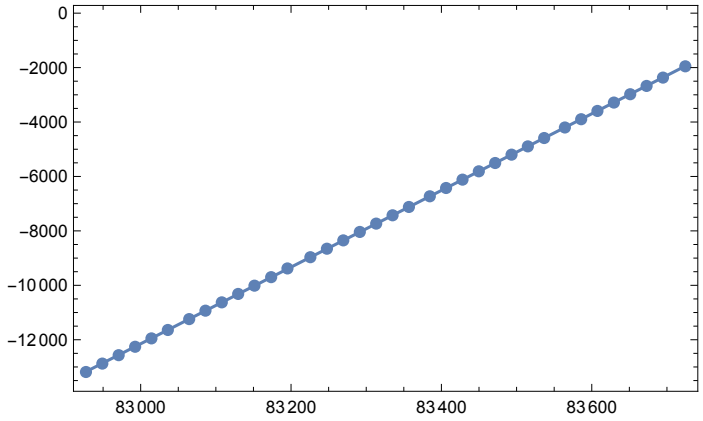
nConstLeft

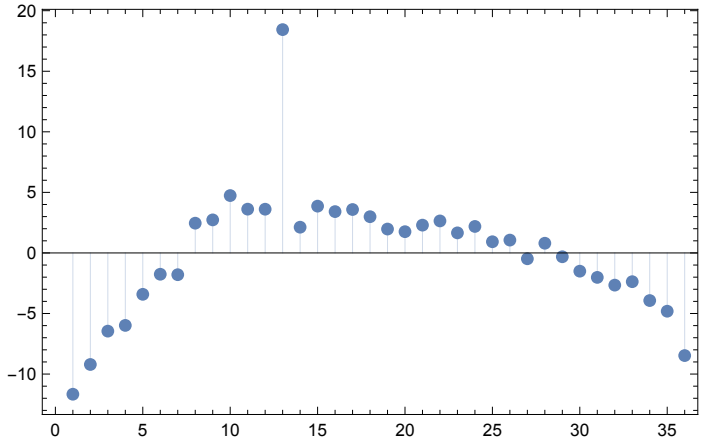




	Estimate	Standard Error	t- Statistic	P- Value
x	-1.21767×10^{6}	233.036	−5225.23	5.65653×10^{-102}
v	14.5475	0.00279674	5201.59	6.59943×10^{-102}

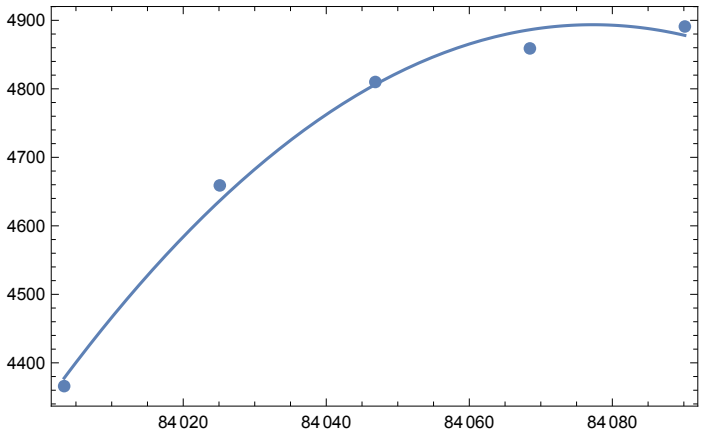
nConstRight

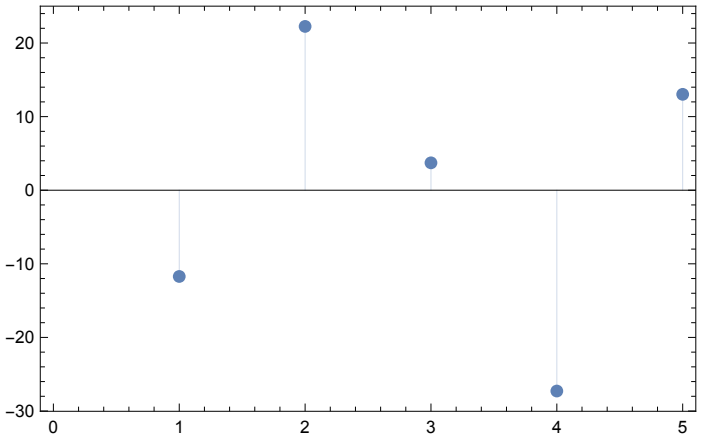




	Estimate	Standard Error	t-Statistic	P-Value
x	-1.18122×10^{6}	307.797	−3837.66	2.04106×10^{-97}
v	14.0852	0.00369397	3813.02	2.54078×10^{-97}

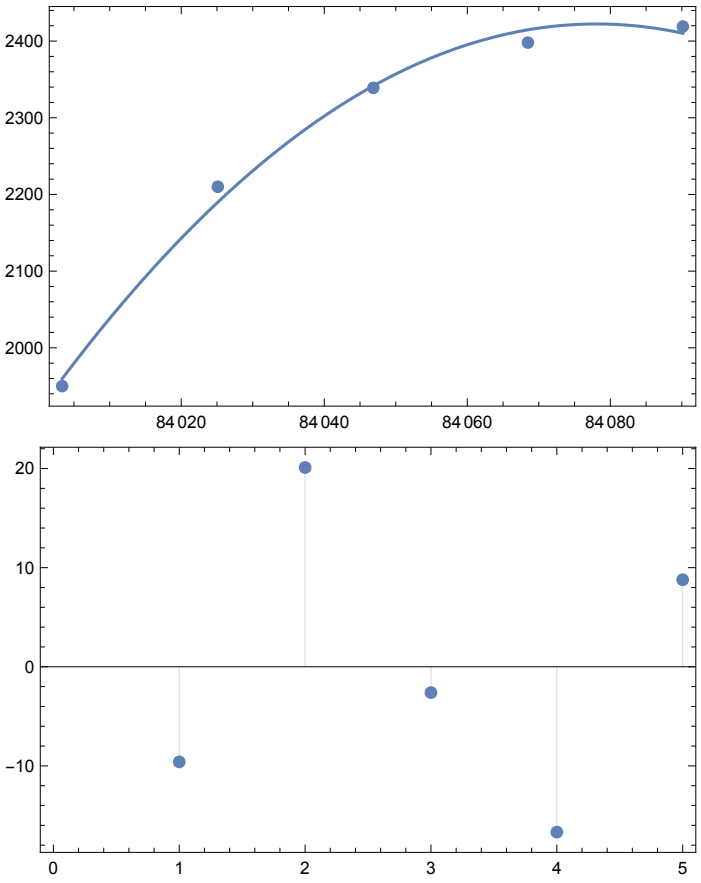
nDecLeft





	Estimate	Standard Error	t- Statistic	P- Value
x	-6.67336×10^{8}	9.69005×10^{-6}	-6.88682×10^{13}	0.
v	15 874.5	0.407209	38 983.6	6.58016×10^{-10}
ka	−0.094404	4.84503×10^{-6}	−19 484.7	2.63397×10^{-9}

nDecRight



	Estimate	Standard Error	t- Statistic	P- Value
x	-5.86008×10^{8}	7.18759×10^{-6}	-8.15305×10^{13}	0.
v	13 939.7	0.302047	46 150.6	4.6951×10^{-10}
ka	−0.0828972	3.5938×10^{-6}	−23 066.7	1.87943×10^{-9}