Hanford Part #1a

Part 1:

Lists and Table

In[8]:=
```
index = List[2.5, 2.6, 3.4, 1.3, 1.6, 3.8, 11.6, 6.4, 8.3]
```
```
{2.5`, 2.6`, 3.4`, 1.3`, 1.6`, 3.8`, 11.6`, 6.4`, 8.3`}
```

In[10]:=
```
deaths = List[147, 130, 130, 114, 138, 162, 208, 178, 210]
```
Out[10]= {147, 130, 130, 114, 138, 162, 208, 178, 210}

In[20]:=
```
Grid[{{"Location", "Umatilla", "Morrow", "Gilliam",
    "Sherman", "Wasco", "Hood River", "Portland", "Columbia", "Clatsop"},
  {"Index", 2.5`, 2.6`, 3.4`, 1.3`, 1.6`, 3.8`, 11.6`, 6.4`, 8.3`},
  {"Deaths", 147, 130, 130, 114, 138, 162, 208, 178, 210}}]
```

In[35]:=
```
Insert[%20, {Dividers → All, Spacings → 1.5 {1, 1}}, 2]
```

Out[35]=

Location	Umatilla	Morrow	Gilliam	Sherman	Wasco	Hood River	Portland	Columbia	Clatsop
Index	2.5	2.6	3.4	1.3	1.6	3.8	11.6	6.4	8.3
Deaths	147	130	130	114	138	162	208	178	210

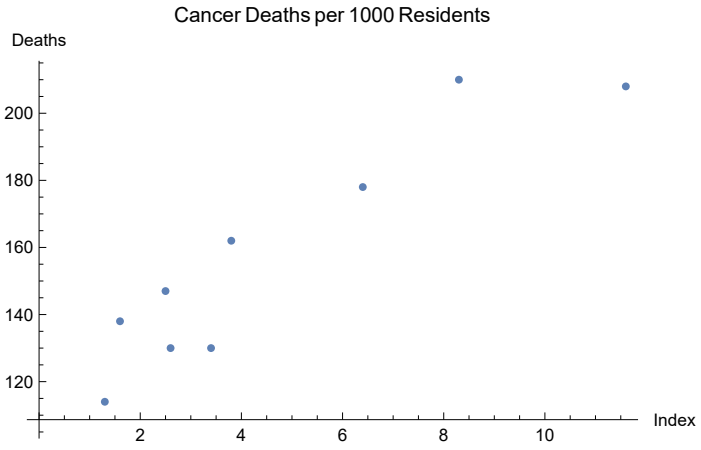
Part 2:

Data Set Graph

In[26]:=
```
transposed = Transpose[{index, deaths}]
```
Out[26]=
```
{{2.5, 147}, {2.6, 130}, {3.4, 130}, {1.3, 114},
 {1.6, 138}, {3.8, 162}, {11.6, 208}, {6.4, 178}, {8.3, 210}}
```

In[138]:=
```
ListPlot[transposed, PlotLabel → HoldForm[Cancer Deaths per 1000 Residents],
 AxesLabel → {HoldForm[Index], HoldForm[Deaths]},
 PlotLabel → HoldForm[Cancer Deaths per 1000 Residents]]
```

Out[138]=



Part 3:

Least Squares Line

In[96]:=
```
A1 = Total[deaths^2]
```
Out[96]=
```
232 741
```

In[97]:=
```
B1 = Total[index^2]
```
Out[97]=
```
287.67
```

In[98]:=
```
C1 = Total[index]
```
Out[98]=
```
41.5
```

In[99]:=
```
D1 = Total[deaths * index]
```
Out[99]=
```
7427.1
```

In[100]:=
```
E1 = Total[deaths]
```
Out[100]= 1417

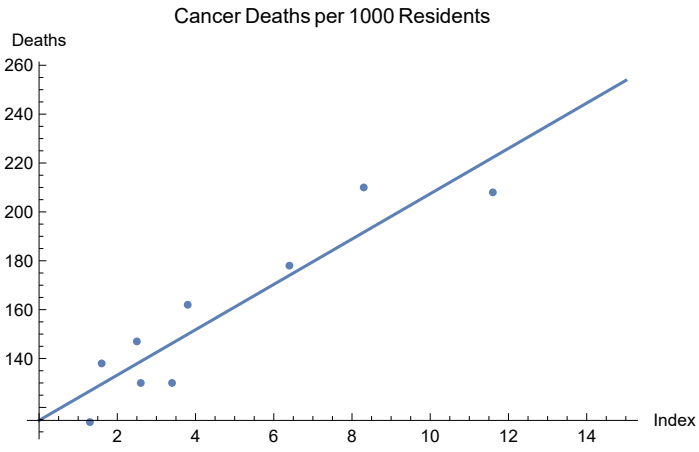
In[101]:=
```
n = Length[deaths]
```
Out[101]= 9

In[105]:=
```
m = (D1 * n - E1 * C1) / (B1 * n - C1^2)
```
Out[105]= 9.27386

In[106]:=
```
b = (E1 - m * C1) / (n)
```
Out[106]= 114.682

In[117]:=
```
f[x_] := m * x + b
```

In[143]:=
```
Show[Plot[f[x], {x, 0, 15}], ListPlot[transposed],
 PlotLabel → HoldForm[Cancer Deaths per 1000 Residents],
 AxesLabel → {HoldForm[Index], HoldForm[Deaths]},
 PlotLabel → HoldForm[Cancer Deaths per 1000 Residents]]
```
Out[143]=



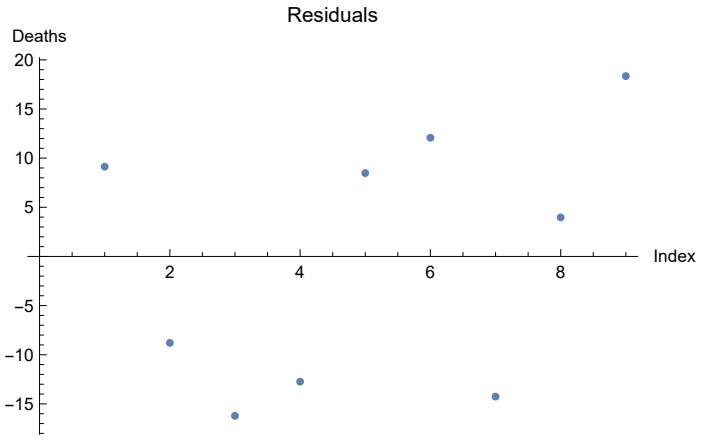
Part 4:

Residuals

In[129]:=
```
linevalue = Table[f[x], {x, index}]
```
Out[129]= {137.866, 138.794, 146.213, 126.738, 129.52, 149.922, 222.258, 174.034, 191.655}

In[130]:=
```
residuals = deaths - linevalue
```
```
{9.133713283647552`, -8.793673135051563`, -16.21276448464431`,
 -12.737649691963327`, 8.480191051939386`, 12.077689840559316`,
 -14.258450817970015`, 3.965642954382872`, 18.34530099910009`}
```

In[146]:=
```
ListPlot[residuals, PlotLabel → HoldForm[Residuals],
 AxesLabel → {HoldForm[Index], HoldForm[Deaths]},
 PlotLabel → HoldForm[Cancer Deaths per 1000 Residents]]
```
Out[146]=



In[134]:=
```
Total[residuals]
```
Out[134]= 0.

Sum of Residuals = 0