Median- Median Regression Line

Data:

```
In[•]:= Grid[List[ {"x" , 7, 16, 1, 8, 13, 6, 11, 14, 10, 3},
          {"y", 8, 15, 5, 9, 22, 7, 8, 9, 6, 2}], Frame → All]
```

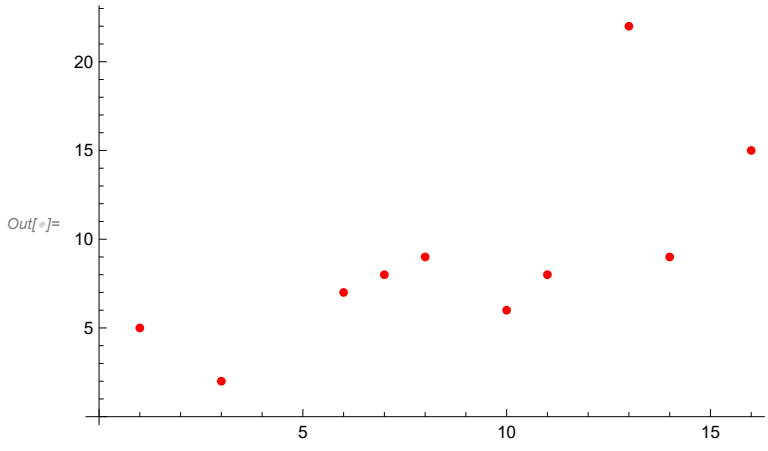
"x"	7	16	1	8	13	6	11	14	10	3
"y"	8	15	5	9	22	7	8	9	6	2

```
In[•]:= xvals := { 7, 16, 1, 8, 13, 6, 11, 14, 10, 3}
        yvals := {8, 15, 5, 9, 22, 7, 8, 9, 6, 2}

In[•]:= sorted = Sort[Transpose[{xvals, yvals}]]

Out[•]= {{1, 5}, {3, 2}, {6, 7}, {7, 8}, {8, 9}, {10, 6}, {11, 8}, {13, 22}, {14, 9}, {16, 15}}
```

Graph of Data Set:

```
In[•]:= ListPlot[{sorted}, PlotStyle → Red]
```

Out[•]=



Median - Median Line Graph:

```
In[•]:= s1x = Median[Take[sorted, 3]]

Out[•]= {3, 5}
```

In[•]:=
```
s2x = Median[Take[sorted, {4, 7}]]
```

Out[•]=
```
{9, 8}
```

In[•]:=
```
s3x = Median[Take[sorted, {8, 10}]]
```

Out[•]=
```
{14, 15}
```

```
line = 10 / 11 (x) + b
```

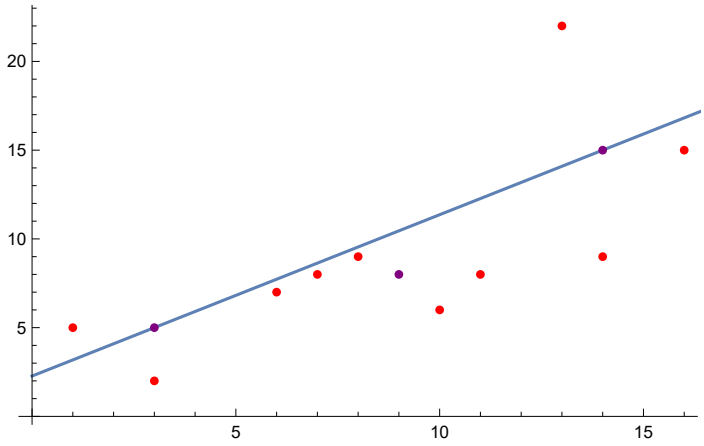
In[•]:=
```
b = 5 - ((10 / 11) * 3)
```

Out[•]=
$$\frac{25}{11}$$

```
f[x_] := 10 / 11 (x) + 25 / 11
```

In[•]:=
```
Show[ListPlot[sorted, PlotStyle → Red], Plot[ {y = 10 / 11 (x) + 25 / 11}, {x, 0, 18}],
 ListPlot[{s1x, s2x, s3x}, PlotStyle → Purple]]
```

Out[•]=



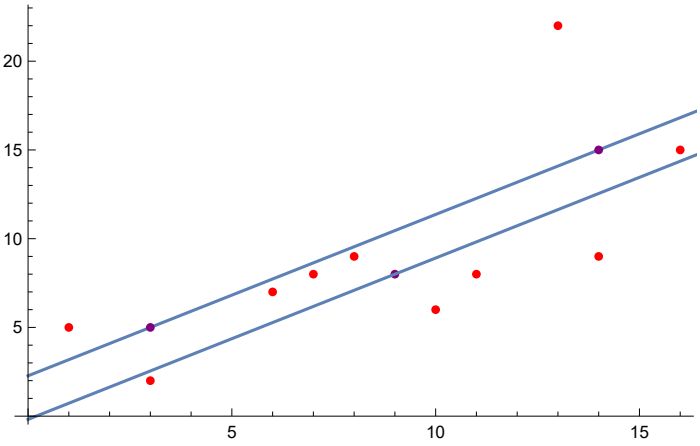
In[•]:=
```
b = 8 - ((10 / 11) * 9)
```

Out[•]=
$$-\frac{2}{11}$$

In[•]:=
```
g[_x] := 10 / 11 (x) - 2 / 11
```

```
In[•]:= Show[ListPlot[sorted, PlotStyle → Red], Plot[ {y = 10 / 11 (x) + 25 / 11}, {x, 0, 18}],
 ListPlot[{s1x, s2x, s3x}, PlotStyle → Purple], Plot[{y = 10 / 11 (x) - 2 / 11}, {x, 0, 18}]]
```

Out[•]=



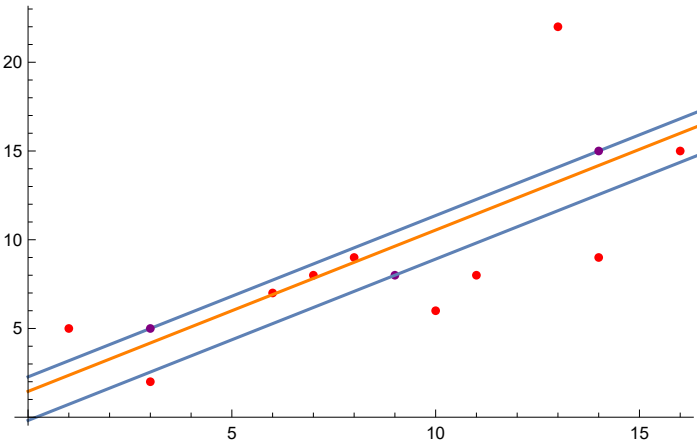

```
In[•]:= newyint = ((2 * (25 / 11)) + (-2 / 11)) / 3
```

$$\text{Out[•]=}\ \frac{16}{11}$$

```
In[•]:= h[x_] := 10 / 11 (xvals) + 16 / 11
```

```
In[•]:= Show[ListPlot[sorted, PlotStyle → Red], Plot[ {y = 10 / 11 (x) + 25 / 11}, {x, 0, 18}],
 ListPlot[{s1x, s2x, s3x}, PlotStyle → Purple], Plot[{y = 10 / 11 (x) - 2 / 11}, {x, 0, 18}],
 Plot[{y = 10 / 11 (x) + 16 / 11}, {x, 0, 18}, PlotStyle → Orange]]
```

Out[•]=



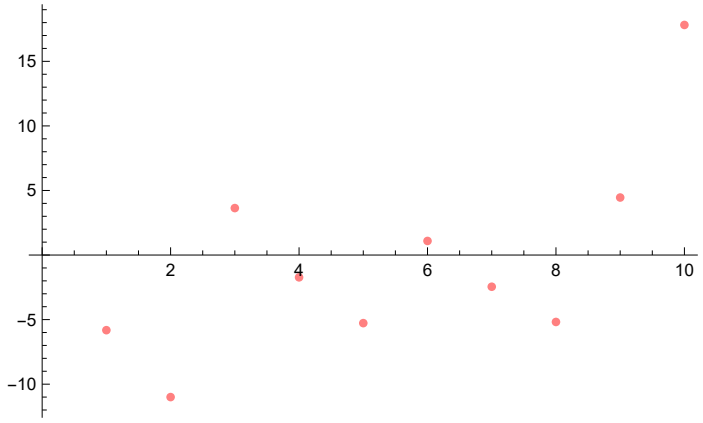
Median - Median Residuals Graph:

```
In[•]:= residualpoints = Sort[yvals] - h[x]
```

$$\text{Out[•]=}\ \left\{-\frac{64}{11}, -11, \frac{40}{11}, -\frac{19}{11}, -\frac{58}{11}, \frac{12}{11}, -\frac{27}{11}, -\frac{57}{11}, \frac{49}{11}, \frac{196}{11}\right\}$$

In[ ]:=
```
ListPlot[{residualpoints}, PlotStyle → Pink]
```

Out[ ]=



Sum of Residuals:

In[ ]:=
```
Total[residualpoints]
```

Out[ ]=
$$-\frac{49}{11}$$