4-21-10

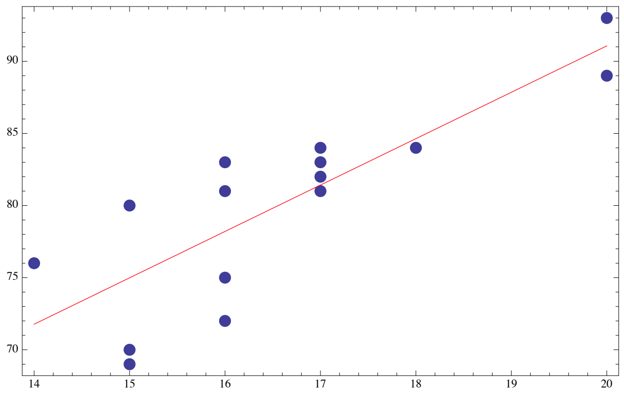
The examples below are from : http://mste.illinois.edu/patel/amar430/
Cricket chirps per second and air temperature.

```
Out[57]//MatrixForm=
  x      y        x^2      y^2      xy
  20     89       400      7921     1780
  16     72       256      5184     1152
  20     93       400      8649     1860
  18     84       324      7056     1512
  17     81       289      6561     1377
  16     75       256      5625     1200
  15     70       225      4900     1050
  17     82       289      6724     1394
  15     69       225      4761     1035
  16     83       256      6889     1328
  15     80       225      6400     1200
  17     83       289      6889     1411
  16     81       256      6561     1296
  17     84       289      7056     1428
  14     76       196      5776     1064
  _      _        _        _        _
 16.6  80.1333  278.333  6463.47  1339.13
```

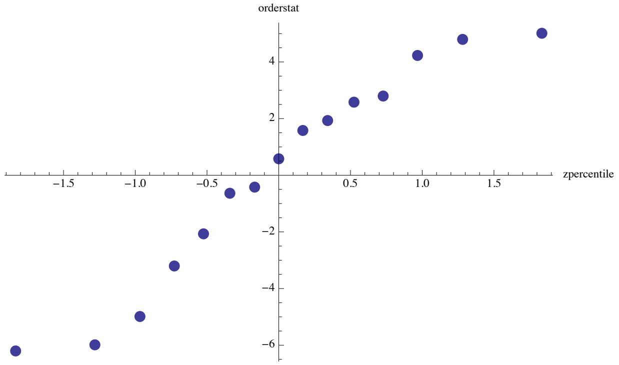
```
In[61]:= regrstats[chps, temp]
Out[61]= {16.6, 80.1333, 1.72378, 6.71743, 0.825358, 3.21635}
```

```
In[59]:= regrplot[chps, temp, .02]
```

Out[59]=



```
normalprobabilityplot[regr0[chps, temp], 0.02]
```



Point of averages = (16.6, 80.1333)

Slope of L.S. line = $b_1 = r\, s_y / s_x$

$= 0.825358\ 6.71743 / 1.72378$

$= 3.21635$

SE(b_1) = (textbook) $s_e / (s_x \sqrt{n-1})$

= (class post) $(\sqrt{1-r^2} / (r \sqrt{n-2}))\ b_1$

$= (\sqrt{1-0.825358^2} / (0.825358 \sqrt{15-2}))\ b_1$

$= 0.610236$

95% t-based CI for population L.S. slope =

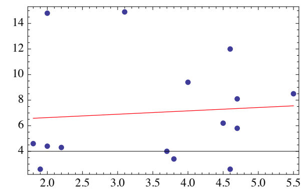
$= b_1 \pm t_{15-2,0.95}\ \mathrm{SE}(b_1)$

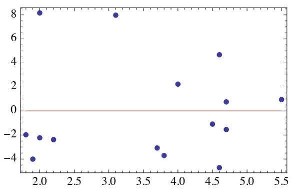
$= 3.21635 \pm\ 2.16\ \ 0.610236$

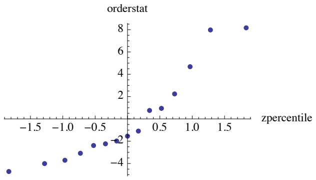
$= \{1.89824, 4.53446\}$

#35. Printers (ppm, cents/page)

```
ppm = {4.6, 5.5, 4.5, 3.8, 4.6, 3.7,
   4.7, 4.7, 4, 3.1, 1.9, 2.2, 1.8, 2, 2}
{4.6, 5.5, 4.5, 3.8, 4.6, 3.7, 4.7,
 4.7, 4, 3.1, 1.9, 2.2, 1.8, 2, 2}
cost = {12, 8.5, 6.2, 3.4, 2.6, 4, 5.8, 8.1,
   9.4, 14.9, 2.6, 4.3, 4.6, 14.8, 4.4}
{12, 8.5, 6.2, 3.4, 2.6, 4, 5.8, 8.1,
 9.4, 14.9, 2.6, 4.3, 4.6, 14.8, 4.4}
regrstats[ppm, cost]
{3.54, 7.04, 1.26649,
 4.14053, 0.0804465, 0.263003}
```





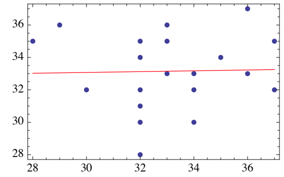


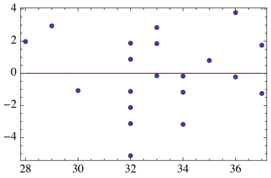
```
regrtable[ppm, cost]
```

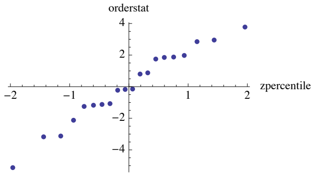
```
  x     y      x²       y²       xy
 4.6   12    21.16     144      55.2
 5.5   8.5   30.25    72.25    46.75
 4.5   6.2   20.25    38.44     27.9
 3.8   3.4   14.44    11.56    12.92
 4.6   2.6   21.16     6.76    11.96
 3.7    4    13.69      16      14.8
 4.7   5.8   22.09    33.64    27.26
 4.7   8.1   22.09    65.61    38.07
  4    9.4     16     88.36     37.6
 3.1   14.9   9.61    222.01   46.19
 1.9   2.6    3.61     6.76     4.94
 2.2   4.3    4.84    18.49     9.46
 1.8   4.6    3.24    21.16     8.28
  2    14.8     4     219.04    29.6
  2    4.4      4     19.36      8.8

  _     _       _        _        _
3.54  7.04  14.0287  65.5627  25.3153
```

36.

```
before = {28, 29, 30, 32, 32, 32, 32, 32, 32,
  33, 33, 33, 34, 34, 34, 35, 36, 36, 37, 37}
{28, 29, 30, 32, 32, 32, 32, 32, 32, 33,
 33, 33, 34, 34, 34, 35, 36, 36, 37, 37}
after = {35, 36, 32, 28, 30, 31, 32, 34, 35,
  36, 33, 35, 32, 30, 33, 34, 37, 33, 35, 32}
{35, 36, 32, 28, 30, 31, 32, 34, 35, 36,
 33, 35, 32, 30, 33, 34, 37, 33, 35, 32}
regrstats[before, after]
{33.05, 33.15, 2.43818,
 2.32322, 0.026481, 0.0252324}
```







$$\left(\begin{array}{ccccc}
x & y & x^2 & y^2 & xy \\
28 & 35 & 784 & 1225 & 980 \\
29 & 36 & 841 & 1296 & 1044 \\
30 & 32 & 900 & 1024 & 960 \\
32 & 28 & 1024 & 784 & 896 \\
32 & 30 & 1024 & 900 & 960 \\
32 & 31 & 1024 & 961 & 992 \\
32 & 32 & 1024 & 1024 & 1024 \\
32 & 34 & 1024 & 1156 & 1088 \\
32 & 35 & 1024 & 1225 & 1120 \\
33 & 36 & 1089 & 1296 & 1188 \\
33 & 33 & 1089 & 1089 & 1089 \\
33 & 35 & 1089 & 1225 & 1155 \\
34 & 32 & 1156 & 1024 & 1088 \\
34 & 30 & 1156 & 900 & 1020 \\
34 & 33 & 1156 & 1089 & 1122 \\
35 & 34 & 1225 & 1156 & 1190 \\
36 & 37 & 1296 & 1369 & 1332 \\
36 & 33 & 1296 & 1089 & 1188 \\
37 & 35 & 1369 & 1225 & 1295 \\
37 & 32 & 1369 & 1024 & 1184 \\
\\
- & - & - & - & - \\
33.05 & 33.15 & 1097.95 & 1104.05 & 1095.75
\end{array}\right)$$