Formulae

- $S_{XX} = \sum (x - \bar{x})^2$
- $S_{XY} = \sum (x - \bar{x})(y - \bar{y})$
- $S_{YY} = \sum (y - \bar{y})^2$
- $r = \frac{S_{XY}}{\sqrt{S_{XX}S_{YY}}}$
- $y = \frac{S_{XY}}{S_{XX}}x + \left(\bar{Y} - \frac{S_{XY}}{S_{XX}}\bar{X}\right)$

Quizzes

6. For the standard normal variable $Z \in N(0, 1)$, find
   
   (a) the area to the left of $z = 2.73$,
   (b) the area to the right of $z = 1.28$,
   (c) the area between $z = .91$ and $z = 2.52$, and
   (d) the value of $z$ such that the area to the left of $z$ is .9419.

   Answer:
   
   (a) .9968
   (b) .1003
   (c) .1755
   (d) $z = 1.57$

7. The grades for a certain exam are distributed normally with mean $\mu = 78$ and standard deviation $\sigma = 5$.

   (a) Sketch the normal curve for this variable and label the mean.
   (b) Find the area to the left of 89. Shade this area on your sketch.
   (c) Find the $60^{th}$ percentile $P_{60}$.
   (d) What percentage of students has a grade above 90?

   Answer:
   
   (a)
   (b) .9861
   (c) $P_{60} = 79.25$
   (d) .0082
8. The population is a set of pencils. Let $X$ be the length in centimeters (cm) and let $Y$ be the mass in grams (g). We have the following data

<table>
<thead>
<tr>
<th>$X$</th>
<th>10</th>
<th>12</th>
<th>15</th>
<th>19</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Y$</td>
<td>21</td>
<td>25</td>
<td>24</td>
<td>30</td>
</tr>
</tbody>
</table>

(a) Draw a scatter diagram.
(b) Find $r$.
(c) Find the equation for the regression line.
(d) What the the weight expected for a 13-centimeter long pencil.

Answer: We compute $S_{XX} = 46$, $S_{XY} = 40$ and $S_{YY} = 42$. Then we have the following.

(a) 
(b) $r = .91$
(c) $y = .87x + 12.83$
(d) 24.14 g.