1. **Solution**
   Let x represent a datum of interest. Let i represent that datum's index. Let ℓ represent that datum's percentile. Let n represent the sample size (number of measurements). In general,

   $$\ell = \frac{i}{n}$$

   (a) We are given $x = 59.116$. This means $i = 9$. We know $n = 9$. Determine the percentile ℓ.

   $$\ell = \frac{9}{9}$$

   $$\ell = 1$$

   So, the percentile rank is $\boxed{1}$, or 100th percentile.

   (b) We are given $\ell = 0.889$. We can use algebra to solve for i.

   $$\ell = \frac{i}{n}$$

   Multiply both sides by n.

   $$n \cdot (\ell) = n \cdot \left(\frac{i}{n}\right)$$

   Simplify both sides.

   $$n\ell = i$$

   To make me happy, switch the sides.

   $$i = n\ell$$

   Now, we can evaluate i.

   $$i = (9)(0.889)$$
   $$i = 8$$

   Determine the x associated with $i = 8$.

   $$x = \boxed{59.089}$$

   (c) The mean: $\bar{x} = \frac{504.714}{9} = \boxed{56.079}$

   (d) If n is odd, then median is $x_{i=\frac{n+1}{2}}$, the value of x when $i = \frac{n+1}{2}$. Otherwise, if n is even, the median is mean of $x_{i=\frac{n}{2}}$ and $x_{i=\frac{n}{2}+1}$. In this case, $n = 9$ and so n is odd.

   $$\text{median} = x_{(9+1)/2,} = x_5$$

   So, median = $\boxed{56.239}$.

2. **Solution**

   Let x represent a datum of interest. Let i represent that datum's index. Let ℓ represent that datum's percentile. Let n represent the sample size (number of measurements). In general,

   $$\ell = \frac{i}{n}$$

   (a) We are given $x = 97.421$. This means $i = 11$. We know $n = 27$. Determine the percentile ℓ.

   $$\ell = \frac{11}{27}$$

   $$\ell = 0.407$$

   So, the percentile rank is $\boxed{0.407}$, or 40.7th percentile.

   (b) We are given $\ell = 0.148$. We can use algebra to solve for i.

   $$\ell = \frac{i}{n}$$

   Multiply both sides by n.

   $$n \cdot (\ell) = n \cdot \left(\frac{i}{n}\right)$$

   Simplify both sides.

   $$n\ell = i$$

   To make me happy, switch the sides.

   $$i = n\ell$$

   Now, we can evaluate i.

   $$i = (27)(0.148)$$

   $$i = 4$$

   Determine the x associated with $i = 4$.

   $$x = \boxed{93.99}$$

   (c) The mean: $\bar{x} = \frac{2709.173}{27} = \boxed{100.34}$

   (d) If n is odd, then median is $x_{i=\frac{n+1}{2}}$, the value of x when $i = \frac{n+1}{2}$. Otherwise, if n is even, the median is mean of $x_{i=\frac{n}{2}}$ and $x_{i=\frac{n}{2}+1}$. In this case, $n = 27$ and so n is odd.

   $$\text{median} = x_{(27+1)/2,} = x_{14}$$

   So, median = $\boxed{101.913}$.