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 $x = 86.975$. This means $i = 3$. We know $n = 10$. Determine the percentile ℓ.

   $$\ell = \frac{3}{10}$$

   $$\ell = 0.3$$

   So, the percentile rank is $\boxed{0.3}$, or 30th percentile.

   (b) We are given $\ell = 0.4$. 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.

   $$i = (10)(0.4)$$
   $$i = 4$$

   Determine the x associated with $i = 4$.

   $$x = \boxed{88.376}$$

   (c) The mean: $\bar{x} = \frac{982.643}{10} = \boxed{98.264}$

   (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, $n = 10$ and so n is even.

   $$\text{median} = \frac{x_5 + x_6}{2} = \frac{88.744 + 90.028}{2}$$

   So, median = $\boxed{89.386}$.

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 $x = 13.209$. This means $i = 1$. We know $n = 28$. Determine the percentile ℓ.

$$\ell = \frac{1}{28}$$

$$\ell = 0.0357$$

So, the percentile rank is $\boxed{0.0357}$, or 3.57th percentile.

(b) We are given $\ell = 0.321$. 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.

$$i = (28)(0.321)$$

$$i = 9$$

Determine the x associated with $i = 9$.

$$x = \boxed{14.687}$$

(c) The mean: $\bar{x} = \frac{423.481}{28} = \boxed{15.124}$

(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, $n = 28$ and so n is even.

$$\text{median} = \frac{x_{14} + x_{15}}{2} = \frac{14.999 + 15.176}{2}$$

So, median = $\boxed{15.0875}$.