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 $x = 24.96$. This means $i = 4$. We know $n = 8$. Determine the percentile ℓ.

$$\ell = \frac{4}{8}$$

$$\ell = 0.5$$

So, the answer is 0.5, or 50%.

(b) We are given $\ell = 0.875$. 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.

$$i = (8)(0.875)$$

$$i = 7$$

Determine the x associated with $i = 7$.

$$x = 27.237$$

(c) The mean is $\frac{190.156}{8} = 23.7695$

(d) If n is odd, then median is $x_{\frac{n+1}{2}}$, the value of x when $i = \frac{n+1}{2}$. Otherwise median is mean of $x_{\lfloor \frac{n+1}{2} \rfloor}$ and $x_{\lceil \frac{n+1}{2} \rceil}$. So, median = 25.285.

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 $x = 90.627$. This means $i = 49$. We know $n = 81$. Determine the percentile ℓ.

$$\ell = \frac{49}{81}$$

$$\ell = 0.605$$

So, the answer is 0.605, or 60.5%.

(b) We are given $\ell = 0.654$. 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.

$$i = (81)(0.654)$$

$$i = 53$$

Determine the x associated with $i = 53$.

$$x = 90.746$$

(c) The mean is $\frac{7343.725}{81} = 90.663$

(d) If n is odd, then median is $x_{\frac{n+1}{2}}$, the value of x when $i = \frac{n+1}{2}$. Otherwise median is mean of $x_{\lfloor \frac{n+1}{2} \rfloor}$ and $x_{\lceil \frac{n+1}{2} \rceil}$. So, median = 90.538.