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 $x = 40.535$. This means $i = 3$. We know $n = 11$. Determine the percentile ℓ.

$$\ell = \frac{3}{11}$$

$$\ell = 0.273$$

So, the answer is 0.273, or 27.3%.

(b) We are given $\ell = 0.182$. 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.

$$i = (11)(0.182)$$

$$i = 2$$

Determine the x associated with $i = 2$.

$$x = 40.437$$

(c) The mean is $\frac{469.674}{11} = 42.6976364$

(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 = 42.309.

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 $x = 85.456$. This means $i = 3$. We know $n = 36$. Determine the percentile ℓ.

$$\ell = \frac{3}{36}$$

$$\ell = 0.0833$$

So, the answer is 0.0833, or 8.33%.

(b) We are given $\ell = 0.139$. 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.

$$i = (36)(0.139)$$

$$i = 5$$

Determine the x associated with $i = 5$.

$$x = 89.182$$

(c) The mean is $\frac{3681.752}{36} = 102.27$

(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 = 103.81.