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 $x = 48.152$. This means $i = 2$. We know $n = 10$. Determine the percentile ℓ.

$$\ell = \frac{2}{10}$$

$$\ell = 0.2$$

So, the answer is 0.2, or 20%.

(b) We are given $\ell = 0.7$. 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.

$$i = (10)(0.7)$$

$$i = 7$$

Determine the x associated with $i = 7$.

$$x = 49.927$$

(c) The mean is $\frac{494.639}{10} = 49.4639$

(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 = 49.4195.

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 $x = 52.698$. This means $i = 13$. We know $n = 54$. Determine the percentile ℓ.

$$\ell = \frac{13}{54}$$

$$\ell = 0.241$$

So, the answer is 0.241, or 24.1%.

(b) We are given $\ell = 0.37$. 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.

$$i = (54)(0.37)$$

$$i = 20$$

Determine the x associated with $i = 20$.

$$x = 53.84$$

(c) The mean is $\frac{2966.532}{54} = 54.936$

(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 = 55.208.