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

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

(a) We are given $x = 74.949$. This means $i = 8$. We know $n = 12$. Determine the percentile $\ell$.

$$\ell = \frac{8}{12}$$

$$\ell = 0.667$$

So, the answer is 0.667, or 66.7%.

(b) We are given $\ell = 0.333$. 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 $i$.

$$i = (12)(0.333)$$

$$i = 4$$

Determine the $x$ associated with $i = 4$.

$$x = 67.169$$

(c) The mean is $\frac{848.94}{12} = 70.745$

(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 = 71.142.

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

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

(a) We are given $x = 30.998$. This means $i = 13$. We know $n = 32$. Determine the percentile $\ell$.

$$\ell = \frac{13}{32}$$

$$\ell = 0.406$$

So, the answer is 0.406, or 40.6%.

(b) We are given $\ell = 0.594$. 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 $i$.

$$i = (32)(0.594)$$

$$i = 19$$

Determine the $x$ associated with $i = 19$.

$$x = 31.398$$

(c) The mean is $\frac{1006.696}{32} = 31.459$

(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 = 31.207.