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 $x = 23.133$. This means $i = 8$. We know $n = 9$. Determine the percentile ℓ.

$$\ell = \frac{8}{9}$$

$$\ell = 0.889$$

So, the percentile rank is $\boxed{0.889}$, or 88.9th percentile.

(b) We are given $\ell = 0.667$. 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.

$$i = (9)(0.667)$$

$$i = 6$$

Determine the x associated with $i = 6$.

$$x = \boxed{14.225}$$

(c) The mean: $\bar{x} = \frac{143.472}{9} = \boxed{15.941}$

(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, $n = 9$ and so n is odd.

$$\text{median} = x_{(9+1)/2,} = x_5$$

So, median = $\boxed{14.162}$.

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 $x = 33.969$. This means $i = 24$. We know $n = 32$. Determine the percentile ℓ.

$$\ell = \frac{24}{32}$$

$$\ell = 0.75$$

So, the percentile rank is $\boxed{0.75}$, or 75th percentile.

(b) We are given $\ell = 0.438$. 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.

$$i = (32)(0.438)$$

$$i = 14$$

Determine the x associated with $i = 14$.

$$x = \boxed{27.868}$$

(c) The mean: $\bar{x} = \frac{956.132}{32} = \boxed{29.879}$

(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, $n = 32$ and so n is even.

$$\text{median} = \frac{x_{16} + x_{17}}{2} = \frac{28.402 + 30.474}{2}$$

So, median = $\boxed{29.438}$.