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 $x = 41.054$. This means $i = 8$. We know $n = 12$. Determine the percentile ℓ.

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

   $$\ell = 0.667$$

   So, the percentile rank is $\boxed{0.667}$, or 66.7th percentile.

   (b) We are given $\ell = 0.417$. 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.

   $$i = (12)(0.417)$$
   $$i = 5$$

   Determine the x associated with $i = 5$.

   $$x = \boxed{37.884}$$

   (c) The mean: $\bar{x} = \frac{485.022}{12} = \boxed{40.418}$

   (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, $n = 12$ and so n is even.

   $$\text{median} = \frac{x_6 + x_7}{2} = \frac{38.888 + 39.625}{2}$$

   So, median = $\boxed{39.2565}$.

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 $x = 23.658$. This means $i = 58$. We know $n = 81$. Determine the percentile ℓ.

   $$\ell = \frac{58}{81}$$

   $$\ell = 0.716$$

   So, the percentile rank is $\boxed{0.716}$, or 71.6th percentile.

   (b) We are given $\ell = 0.938$. 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.

   $$i = (81)(0.938)$$

   $$i = 76$$

   Determine the x associated with $i = 76$.

   $$x = \boxed{25.878}$$

   (c) The mean: $\bar{x} = \frac{1839.839}{81} = \boxed{22.714}$

   (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, $n = 81$ and so n is odd.

   $$\text{median} = x_{(81+1)/2,} = x_{41}$$

   So, median = $\boxed{22.594}$.