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 $x = 148.486$. This means $i = 4$. We know $n = 6$. Determine the percentile ℓ.

   $$\ell = \frac{4}{6}$$

   $$\ell = 0.667$$

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

   (b) We are given $\ell = 0.5$. 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.

   $$i = (6)(0.5)$$
   $$i = 3$$

   Determine the x associated with $i = 3$.

   $$x = \boxed{129.095}$$

   (c) The mean: $\bar{x} = \frac{817.856}{6} = \boxed{136.31}$

   (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, $n = 6$ and so n is even.

   $$\text{median} = \frac{x_3 + x_4}{2} = \frac{129.095 + 148.486}{2}$$

   So, median = $\boxed{138.7905}$.

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 $x = 51.711$. This means $i = 7$. We know $n = 12$. Determine the percentile ℓ.

   $$\ell = \frac{7}{12}$$

   $$\ell = 0.583$$

   So, the percentile rank is $\boxed{0.583}$, or 58.3th percentile.

   (b) We are given $\ell = 0.25$. 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.

   $$i = (12)(0.25)$$
   $$i = 3$$

   Determine the x associated with $i = 3$.

   $$x = \boxed{50.441}$$

   (c) The mean: $\bar{x} = \frac{624.382}{12} = \boxed{52.032}$

   (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.

   $$\text{median} = \frac{x_6 + x_7}{2} = \frac{51.334 + 51.711}{2}$$

   So, median $= \boxed{51.5225}$.