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 $x = 111.204$. This means $i = 9$. We know $n = 12$. Determine the percentile ℓ.

   $$\ell = \frac{9}{12}$$

   $$\ell = 0.75$$

   So, the answer is 0.75, or 75%.

   (b) We are given $\ell = 0.833$. 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.

   $$i = (12)(0.833)$$

   $$i = 10$$

   Determine the x associated with $i = 10$.

   $$x = 112.994$$

   (c) The mean is $\frac{1312.699}{12} = 109.3915833$

   (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 = 110.8555.

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 $x = 22.249$. This means $i = 6$. We know $n = 63$. Determine the percentile ℓ.

$$\ell = \frac{6}{63}$$

$$\ell = 0.0952$$

   So, the answer is 0.0952, or 9.52%.

   (b) We are given $\ell = 0.762$. 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.

$$i = (63)(0.762)$$

$$i = 48$$

   Determine the x associated with $i = 48$.

$$x = 34.755$$

   (c) The mean is $\frac{1907.16}{63} = 30.272$

   (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 = 30.388.