

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 $x = 11.621$. This means $i = 9$. We know $n = 10$. Determine the percentile ℓ .

$$\ell = \frac{9}{10}$$

$$\ell = 0.9$$

So, the percentile rank is $\boxed{0.9}$, or 90th percentile.

(b) We are given $\ell = 1$. 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 .

$$i = (10)(1)$$

$$i = 10$$

Determine the x associated with $i = 10$.

$$x = \boxed{12.786}$$

(c) The mean: $\bar{x} = \frac{108.625}{10} = \boxed{10.862}$

(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, $n = 10$ and so n is even.

$$\text{median} = \frac{x_5 + x_6}{2} = \frac{10.57 + 10.644}{2}$$

So, median = $\boxed{10.607}$.

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 $x = 127.57$. This means $i = 48$. We know $n = 56$. Determine the percentile ℓ .

$$\ell = \frac{48}{56}$$

$$\ell = 0.857$$

So, the percentile rank is $\boxed{0.857}$, or 85.7th percentile.

(b) We are given $\ell = 0.357$. 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 .

$$i = (56)(0.357)$$

$$i = 20$$

Determine the x associated with $i = 20$.

$$x = \boxed{116.073}$$

(c) The mean: $\bar{x} = \frac{6651.772}{56} = \boxed{118.78}$

(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, $n = 56$ and so n is even.

$$\text{median} = \frac{x_{28} + x_{29}}{2} = \frac{118.691 + 119.32}{2}$$

So, median = $\boxed{119.0055}$.