

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 $x = 80.307$. This means $i = 4$. We know $n = 9$. Determine the percentile ℓ .

$$\ell = \frac{4}{9}$$

$$\ell = 0.444$$

So, the percentile rank is $\boxed{0.444}$, or 44.4th percentile.

(b) We are given $\ell = 0.889$. 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 .

$$i = (9)(0.889)$$

$$i = 8$$

Determine the x associated with $i = 8$.

$$x = \boxed{81.652}$$

(c) The mean: $\bar{x} = \frac{727.193}{9} = \boxed{80.799}$

(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 = $\boxed{80.662}$.

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 $x = 44.622$. This means $i = 43$. We know $n = 49$. Determine the percentile ℓ .

$$\ell = \frac{43}{49}$$

$$\ell = 0.878$$

So, the percentile rank is $\boxed{0.878}$, or 87.8th percentile.

(b) We are given $\ell = 0.959$. 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 .

$$i = (49)(0.959)$$

$$i = 47$$

Determine the x associated with $i = 47$.

$$x = \boxed{44.749}$$

(c) The mean: $\bar{x} = \frac{2081.294}{49} = \boxed{42.475}$

(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, $n = 49$ and so n is odd.

$$\text{median} = x_{(49+1)/2} = x_{25}$$

So, median = $\boxed{42.543}$.