

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 $x = 81.903$. This means $i = 8$. We know $n = 9$. Determine the percentile ℓ .

$$\ell = \frac{8}{9}$$

$$\ell = 0.889$$

So, the percentile rank is $\boxed{0.889}$, or 88.9th percentile.

(b) We are given $\ell = 0.556$. 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 .

$$i = (9)(0.556)$$

$$i = 5$$

Determine the x associated with $i = 5$.

$$x = \boxed{80.117}$$

(c) The mean: $\bar{x} = \frac{722.336}{9} = \boxed{80.26}$

(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 = $\boxed{80.117}$.

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 $x = 79.649$. This means $i = 35$. We know $n = 36$. Determine the percentile ℓ .

$$\ell = \frac{35}{36}$$

$$\ell = 0.972$$

So, the percentile rank is $\boxed{0.972}$, or 97.2th percentile.

(b) We are given $\ell = 0.667$. 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 .

$$i = (36)(0.667)$$

$$i = 24$$

Determine the x associated with $i = 24$.

$$x = \boxed{71.218}$$

(c) The mean: $\bar{x} = \frac{2524.923}{36} = \boxed{70.137}$

(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, $n = 36$ and so n is even.

$$\text{median} = \frac{x_{18} + x_{19}}{2} = \frac{69.01 + 69.202}{2}$$

So, median = $\boxed{69.106}$.