

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 $x = 20.159$. This means $i = 1$. We know $n = 6$. Determine the percentile ℓ .

$$\ell = \frac{1}{6}$$

$$\ell = 0.167$$

So, the percentile rank is $\boxed{0.167}$, or 16.7th 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 $i = 3$.

$$x = \boxed{23.376}$$

(c) The mean: $\bar{x} = \frac{146.171}{6} = \boxed{24.362}$

(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.

$$\text{median} = \frac{x_3 + x_4}{2} = \frac{23.376 + 25.837}{2}$$

So, median = $\boxed{24.6065}$.

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 $x = 90.283$. This means $i = 9$. We know $n = 16$. Determine the percentile ℓ .

$$\ell = \frac{9}{16}$$

$$\ell = 0.562$$

So, the percentile rank is $\boxed{0.562}$, or 56.2th percentile.

(b) We are given $\ell = 0.375$. 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 .

$$i = (16)(0.375)$$

$$i = 6$$

Determine the x associated with $i = 6$.

$$x = \boxed{70.678}$$

(c) The mean: $\bar{x} = \frac{1468.949}{16} = \boxed{91.809}$

(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, $n = 16$ and so n is even.

$$\text{median} = \frac{x_8 + x_9}{2} = \frac{79.842 + 90.283}{2}$$

So, median = $\boxed{85.0625}$.