

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 $x = 50.917$. This means $i = 7$. We know $n = 9$. Determine the percentile ℓ .

$$\ell = \frac{7}{9}$$

$$\ell = 0.778$$

So, the percentile rank is $\boxed{0.778}$, or 77.8th 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 .

$$i = (9)(1)$$

$$i = 9$$

Determine the x associated with $i = 9$.

$$x = \boxed{52.05}$$

(c) The mean: $\bar{x} = \frac{457.08}{9} = \boxed{50.787}$

(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 = $\boxed{50.686}$.

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 $x = 165.293$. This means $i = 27$. We know $n = 30$. Determine the percentile ℓ .

$$\ell = \frac{27}{30}$$

$$\ell = 0.9$$

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

(b) We are given $\ell = 0.633$. 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 .

$$i = (30)(0.633)$$

$$i = 19$$

Determine the x associated with $i = 19$.

$$x = \boxed{153.478}$$

(c) The mean: $\bar{x} = \frac{4249.576}{30} = \boxed{141.65}$

(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, $n = 30$ and so n is even.

$$\text{median} = \frac{x_{15} + x_{16}}{2} = \frac{149.057 + 149.401}{2}$$

So, median = $\boxed{149.229}$.