

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 $x = 49.368$. This means $i = 6$. We know $n = 8$. Determine the percentile ℓ .

$$\ell = \frac{6}{8}$$

$$\ell = 0.75$$

So, the percentile rank is $\boxed{0.75}$, or 75th percentile.

(b) We are given $\ell = 0.25$. 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 .

$$i = (8)(0.25)$$

$$i = 2$$

Determine the x associated with $i = 2$.

$$x = \boxed{42.342}$$

(c) The mean: $\bar{x} = \frac{370.729}{8} = \boxed{46.341}$

(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, $n = 8$ and so n is even.

$$\text{median} = \frac{x_4 + x_5}{2} = \frac{45.662 + 47.342}{2}$$

So, median = $\boxed{46.502}$.

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 $x = 73.921$. This means $i = 48$. We know $n = 72$. Determine the percentile ℓ .

$$\ell = \frac{48}{72}$$

$$\ell = 0.667$$

So, the percentile rank is $\boxed{0.667}$, or 66.7th percentile.

(b) We are given $\ell = 0.0417$. 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 .

$$i = (72)(0.0417)$$

$$i = 3$$

Determine the x associated with $i = 3$.

$$x = \boxed{60.006}$$

(c) The mean: $\bar{x} = \frac{5048.393}{72} = \boxed{70.117}$

(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, $n = 72$ and so n is even.

$$\text{median} = \frac{x_{36} + x_{37}}{2} = \frac{70.836 + 70.881}{2}$$

So, median = $\boxed{70.8585}$.