

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 $x = 39.555$. This means $i = 9$. We know $n = 10$. Determine the percentile ℓ .

$$\ell = \frac{9}{10}$$

$$\ell = 0.9$$

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

(b) We are given $\ell = 0.1$. 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 .

$$i = (10)(0.1)$$

$$i = 1$$

Determine the x associated with $i = 1$.

$$x = \boxed{33.679}$$

(c) The mean: $\bar{x} = \frac{375.628}{10} = \boxed{37.563}$

(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, $n = 10$ and so n is even.

$$\text{median} = \frac{x_5 + x_6}{2} = \frac{37.952 + 38.171}{2}$$

So, median = $\boxed{38.0615}$.

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 $x = 10.631$. This means $i = 22$. We know $n = 70$. Determine the percentile ℓ .

$$\ell = \frac{22}{70}$$

$$\ell = 0.314$$

So, the percentile rank is $\boxed{0.314}$, or 31.4th percentile.

(b) We are given $\ell = 0.786$. 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 .

$$i = (70)(0.786)$$

$$i = 55$$

Determine the x associated with $i = 55$.

$$x = \boxed{12.368}$$

(c) The mean: $\bar{x} = \frac{796.947}{70} = \boxed{11.385}$

(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, $n = 70$ and so n is even.

$$\text{median} = \frac{x_{35} + x_{36}}{2} = \frac{11.45 + 11.543}{2}$$

So, median = $\boxed{11.4965}$.