

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 $x = 103.975$. This means $i = 6$. We know $n = 7$. Determine the percentile ℓ .

$$\ell = \frac{6}{7}$$

$$\ell = 0.857$$

So, the percentile rank is 0.857, or 85.7th percentile.

(b) We are given $\ell = 0.714$. 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 .

$$i = (7)(0.714)$$

$$i = 5$$

Determine the x associated with $i = 5$.

$$x = \text{99.918}$$

(c) The mean: $\bar{x} = \frac{667.737}{7} = \text{95.391}$

(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, $n = 7$ and so n is odd.

$$\text{median} = x_{(7+1)/2} = x_4$$

So, median = 95.276.

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 $x = 120.259$. This means $i = 54$. We know $n = 63$. Determine the percentile ℓ .

$$\ell = \frac{54}{63}$$

$$\ell = 0.857$$

So, the percentile rank is $\boxed{0.857}$, or 85.7th percentile.

(b) We are given $\ell = 0.698$. 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 .

$$i = (63)(0.698)$$

$$i = 44$$

Determine the x associated with $i = 44$.

$$x = \boxed{117.431}$$

(c) The mean: $\bar{x} = \frac{6503.93}{63} = \boxed{103.24}$

(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, $n = 63$ and so n is odd.

$$\text{median} = x_{(63+1)/2} = x_{32}$$

So, median = $\boxed{106.869}$.