

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 $x = 126.631$. This means $i = 1$. We know $n = 7$. Determine the percentile ℓ .

$$\ell = \frac{1}{7}$$

$$\ell = 0.143$$

So, the percentile rank is 0.143, or 14.3th percentile.

(b) We are given $\ell = 0.857$. 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 .

$$i = (7)(0.857)$$

$$i = 6$$

Determine the x associated with $i = 6$.

$$x = \text{156.145}$$

(c) The mean: $\bar{x} = \frac{1029.771}{7} = \text{147.11}$

(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 = 154.937.

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 $x = 94.553$. This means $i = 12$. We know $n = 36$. Determine the percentile ℓ .

$$\ell = \frac{12}{36}$$

$$\ell = 0.333$$

So, the percentile rank is $\boxed{0.333}$, or 33.3th percentile.

(b) We are given $\ell = 0.194$. 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 .

$$i = (36)(0.194)$$

$$i = 7$$

Determine the x associated with $i = 7$.

$$x = \boxed{94.101}$$

(c) The mean: $\bar{x} = \frac{3415.95}{36} = \boxed{94.888}$

(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, $n = 36$ and so n is even.

$$\text{median} = \frac{x_{18} + x_{19}}{2} = \frac{94.747 + 94.831}{2}$$

So, median = $\boxed{94.789}$.