

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 $x = 92.74$. This means $i = 6$. We know $n = 6$. Determine the percentile ℓ .

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

$$\ell = 1$$

So, the percentile rank is 1, or 100th percentile.

(b) We are given $\ell = 0.833$. 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 .

$$i = (6)(0.833)$$

$$i = 5$$

Determine the x associated with $i = 5$.

$$x = \text{92.622}$$

(c) The mean: $\bar{x} = \frac{553.561}{6} = \text{92.26}$

(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, $n = 6$ and so n is even.

$$\text{median} = \frac{x_3 + x_4}{2} = \frac{92.159 + 92.44}{2}$$

So, median = 92.2995.

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 $x = 74.282$. This means $i = 21$. We know $n = 24$. Determine the percentile ℓ .

$$\ell = \frac{21}{24}$$

$$\ell = 0.875$$

So, the percentile rank is $\boxed{0.875}$, or 87.5th percentile.

(b) We are given $\ell = 0.75$. 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 .

$$i = (24)(0.75)$$

$$i = 18$$

Determine the x associated with $i = 18$.

$$x = \boxed{68.889}$$

(c) The mean: $\bar{x} = \frac{1638.225}{24} = \boxed{68.259}$

(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, $n = 24$ and so n is even.

$$\text{median} = \frac{x_{12} + x_{13}}{2} = \frac{66.773 + 66.853}{2}$$

So, median = $\boxed{66.813}$.