

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 $x = 74.1$. This means $i = 3$. We know $n = 7$. Determine the percentile ℓ .

$$\ell = \frac{3}{7}$$

$$\ell = 0.429$$

So, the percentile rank is $\boxed{0.429}$, or 42.9th percentile.

(b) We are given $\ell = 0.286$. 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 .

$$i = (7)(0.286)$$

$$i = 2$$

Determine the x associated with $i = 2$.

$$x = \boxed{68.636}$$

(c) The mean: $\bar{x} = \frac{516.858}{7} = \boxed{73.837}$

(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 = $\boxed{76.338}$.

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 $x = 68.704$. This means $i = 24$. We know $n = 63$. Determine the percentile ℓ .

$$\ell = \frac{24}{63}$$

$$\ell = 0.381$$

So, the percentile rank is $\boxed{0.381}$, or 38.1th percentile.

(b) We are given $\ell = 0.254$. 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 .

$$i = (63)(0.254)$$

$$i = 16$$

Determine the x associated with $i = 16$.

$$x = \boxed{65.925}$$

(c) The mean: $\bar{x} = \frac{4382.071}{63} = \boxed{69.557}$

(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 = $\boxed{70.334}$.