

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 $x = 40.535$. This means $i = 3$. We know $n = 11$. Determine the percentile ℓ .

$$\ell = \frac{3}{11}$$

$$\ell = 0.273$$

So, the percentile rank is $\boxed{0.273}$, or 27.3th percentile.

(b) We are given $\ell = 0.182$. 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 .

$$i = (11)(0.182)$$

$$i = 2$$

Determine the x associated with $i = 2$.

$$x = \boxed{40.437}$$

(c) The mean: $\bar{x} = \frac{469.674}{11} = \boxed{42.698}$

(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, $n = 11$ and so n is odd.

$$\text{median} = x_{(11+1)/2} = x_6$$

So, median = $\boxed{42.309}$.

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 $x = 96.198$. This means $i = 12$. We know $n = 30$. Determine the percentile ℓ .

$$\ell = \frac{12}{30}$$

$$\ell = 0.4$$

So, the percentile rank is $\boxed{0.4}$, or 40th percentile.

(b) We are given $\ell = 0.0667$. 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 .

$$i = (30)(0.0667)$$

$$i = 2$$

Determine the x associated with $i = 2$.

$$x = \boxed{82.159}$$

(c) The mean: $\bar{x} = \frac{3060.745}{30} = \boxed{102.02}$

(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, $n = 30$ and so n is even.

$$\text{median} = \frac{x_{15} + x_{16}}{2} = \frac{103.694 + 105.265}{2}$$

So, median = $\boxed{104.4795}$.