

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 $x = 51.471$. This means $i = 4$. We know $n = 7$. Determine the percentile ℓ .

$$\ell = \frac{4}{7}$$

$$\ell = 0.571$$

So, the answer is 0.571, or 57.1%.

(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 $i = 5$.

$$x = 52.323$$

(c) The mean is $\frac{360.927}{7} = 51.561$

(d) If n is odd, then median is $x_{\frac{n+1}{2}}$, the value of x when $i = \frac{n+1}{2}$. Otherwise median is mean of $x_{\lfloor \frac{n+1}{2} \rfloor}$ and $x_{\lceil \frac{n+1}{2} \rceil}$. So, median = 51.471.

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 $x = 124.508$. This means $i = 34$. We know $n = 45$. Determine the percentile ℓ .

$$\ell = \frac{34}{45}$$

$$\ell = 0.756$$

So, the answer is 0.756, or 75.6%.

(b) We are given $\ell = 0.844$. 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 .

$$i = (45)(0.844)$$

$$i = 38$$

Determine the x associated with $i = 38$.

$$x = 132.134$$

(c) The mean is $\frac{4946.09}{45} = 109.91$

(d) If n is odd, then median is $x_{\frac{n+1}{2}}$, the value of x when $i = \frac{n+1}{2}$. Otherwise median is mean of $x_{\lfloor \frac{n+1}{2} \rfloor}$ and $x_{\lceil \frac{n+1}{2} \rceil}$. So, median = 102.62.