

**1. Solution**

Let  $x$  represent a datum of interest. Let  $i$  represent that datum's index. Let  $\ell$  represent that datum's percentile. Let  $n$  represent the sample size (number of measurements). In general,

$$\ell = \frac{i}{n}$$

(a) We are given  $x = 51.108$ . This means  $i = 7$ . We know  $n = 7$ . Determine the percentile  $\ell$ .

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

$$\ell = 1$$

So, the answer is 1, or 100%.

(b) We are given  $\ell = 0.571$ . 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  $i$ .

$$i = (7)(0.571)$$

$$i = 4$$

Determine the  $x$  associated with  $i = 4$ .

$$x = 50.518$$

(c) The mean is  $\frac{353.713}{7} = 50.5304286$

(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 = 50.518.

**2. Solution**

Let  $x$  represent a datum of interest. Let  $i$  represent that datum's index. Let  $\ell$  represent that datum's percentile. Let  $n$  represent the sample size (number of measurements). In general,

$$\ell = \frac{i}{n}$$

(a) We are given  $x = 95.673$ . This means  $i = 10$ . We know  $n = 54$ . Determine the percentile  $\ell$ .

$$\ell = \frac{10}{54}$$

$$\ell = 0.185$$

So, the answer is 0.185, or 18.5%.

(b) We are given  $\ell = 0.722$ . 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  $i$ .

$$i = (54)(0.722)$$

$$i = 39$$

Determine the  $x$  associated with  $i = 39$ .

$$x = 105.157$$

(c) The mean is  $\frac{5401.499}{54} = 100.03$

(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 = 100.4.