Statistical Reasoning Name:

Activity 3.1 – *Where do I stand?*

Record the height, in inches, of each student in class in the table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |

1) Make a dotplot of the data.



2) Count the number of people in the class that have heights **less than or equal to** your height. Record this value below.

3) What percent of the students in the class have heights equal to or less than yours? (This is your ***percentile*** in the distribution of heights)

4) Calculate the mean and standard deviation of the class’s height distribution.

5) Where does your height fall relative to the mean: above or below? How far above or below the mean is it?

6) How many standard deviations above or below the mean is your height? (This is the

 ***z-score*** corresponding to your height)

Notes 3.1: Percentiles and Z-scores

**Percentile**

The ***p*th percentile** of a distribution is the value with *p* percent of the observations less than it.

Example: Let’s say your height is in the 75th percentile for your age group. What does this mean?

**Z-score**

The standardized value of an observation. The formula to find the z-score of a data value is:



A z-score tells us \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the original observation falls and in what direction.

 The mean z-score will always be 0.

Larger than the mean = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Smaller than the mean = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Example 1**: A normal distribution of scores has a standard deviation of 10. Find the z-score

 corresponding to each of the following values (round to nearest hundredth):

1. Score of 60 where the mean score of the data values is 40
2. Score of 80 where the mean score of the data values is 30.5

**Example 2:** Below are the sorted ages of the winners of best acrtress.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 21 | 22 | 23 | 23 | 23 | 23 | 23 | 23 | 23 | 26 | 26 | 26 |
| 26 | 27 | 27 | 27 | 27 | 28 | 28 | 28 | 28 | 29 | 29 | 29 |
| 29 | 29 | 29 | 30 | 30 | 31 | 31 | 31 | 32 | 32 | 33 | 33 |
| 33 | 33 | 33 | 34 | 34 | 37 | 38 | 38 | 38 | 38 | 39 | 40 |
| 41 | 41 | 41 | 41 | 41 | 42 | 43 | 45 | 46 | 49 | 50 | 54 |
| 60 | 61 | 63 |  |  |  |  |  |  |  |  |  |

Find the percentile corresponding to the ages below:

1. 42 years old
2. 50 years old

Find the age associated with the given percentile.

1. 66th percentile
2. 85th percentile