Statistics & Probability | 3rd Quarter

WW 4: Standard Scores

February 10 2021

Solve and Interpret the following problem:

1. On a final examination in Mathematics, the mean was 76 and the standard deviation was 5. Determine the standard score of a student who received a score of 88 assuming the scores are normally distributed.

$$z = \frac{x - \bar{x}}{s}$$
$$z = \frac{88 - 76}{5}$$
$$z = \frac{12}{5}$$
$$z = 2.4 \quad / \text{ Above Average}$$

2. On a test in Statistics, the mean is 65 and the standard deviation is 3. Assuming normality, what is the standard score of a student who receives a score of 60?

$$z = \frac{x - \bar{x}}{s}$$
$$z = \frac{65 - 60}{3}$$
$$z = \frac{5}{3}$$
$$z = 1.\bar{6} \quad / \text{ Above Average}$$

3. Lody gets a score of 85 in Biology test and 80 in a Math test. Scores in Biology test have a mean of 75 and standard deviation of 5. Scores in Math test have a mean of 76 and standard deviation of 4. In which subject is her standing better assuming that the scores in the two subjects are normally distributed?

$$z = \frac{85 - 75}{5} \quad \text{Biology Test}$$
$$z = \frac{10}{5} = 2$$

$$z = \frac{80 - 76}{4} \quad \text{Math Test}$$
$$z = \frac{4}{4} = 1$$

2 > 1   Therefore, Lody had better standing in the Biology test.

4. Consider the normal distribution of IQs with a mean of 100 and a standard deviation of 16. What percentage of IQs are:

a) Greater than 95?

$$z = \frac{95 - 100}{16}$$

$$z = \frac{-5}{16} = (-0.3125)$$

$$z = (0.3125) = 12.17\% + 50\% = 62.17\%$$

b) Less than 120?

$$z = \frac{120 - 100}{16}$$

$$z = \frac{20}{16} = \frac{5}{4} = 1.25$$

$$z = 1.25 = 39.44\% + 50\% = 89.44\%$$

c) Between 90 and 110?

$$z = 0.63 = 23.57\%$$

$$z = \frac{90 - 100}{16}$$

$$z = \frac{-10}{16} = (-0.625)$$

$$z = 0.63 = 23.57\%$$

$$23.57\% + 23.57\% = 47.14\%$$

5. The mean height of the students in Grade 1 Section Newton is 125cm and the standard deviation is 3.5cm, assuming the heights are normally distributed, what percent of the height is:

a) Greater than 135cm?

$$z = \frac{135 - 125}{3.5}$$

$$z = \frac{10}{3.5} = 2.857$$

$$z = 2.86 = 49.79\% + 50\% = 99.79\%$$

b) Less than 128cm?

$$z=\frac{3}{3.5}=0.857$$
$$z=0.86=30.51\%+50\%=80.51\%$$

c) Between 115 and 130cm?

$$z=\frac{-10}{3.5}=(-2.857)$$
$$z=(-2.86)=49.79\%$$

$$z=\frac{5}{3.5}=1.428$$
$$z=1.43=42.36\%$$

$$49.79\%+42.36\%=92.15\%$$