1. **In a sample of 343 cases, if the mean score for a scale of functional impairment is 60 with a SD=10**
2. If you learn that the median of the functional impairment score is 56 what does this suggest?

Median 56 < mean 60 distribution is positively skew

1. What would knowing that the mode of the functional impairment score= 72 tell you?

Mode 72> mean 60 distribution negatively skewed

1. Assuming the scores are normally distributed what percent of the cases are between 50 and 70?

60-10=50 and 60+10=70 this represents +/- 1 SD so 68%

1. Between what scores are 95% of the cases?

Quick in head 95% is approximately 2SD (scores between 40-80) or can use formula mean+/-1.96(SD)

1. What is the variance for functional impairment?

Variance = SD2 102=100

1. What value represents a standard z-score of 1 and -1?

1 SD above (70) and 1SD below (50)

1. What is the z-score for a score of 68?

Use the z score formula 68-60/10= 8/10=.8

1. What is the standard error of the mean?

 SEM=SD/ sqroot of n 10/sqroot343= 10/18.5= .54

1. What would the 95% confidence interval be for the population mean?

60+/- 1.96(.54) = 60 +/- 1.06 (58.94- 61.06

**2.The vitamin D levels for women aged 20-34 follow an approximately normal distribution with a mean of 35 nanograms per milliliter and a standard deviation of 15.**

1. If levels below 12 ng/mL indicate a vitamin D deficiency, estimate the percent of women who have levels below 12.
2. Visualize it--sketch the mean and z-score

-2SD=5 -1SD=20

|  |  |
| --- | --- |
| calculating via using excel and typing in the following =STANDARDIZE(45,35,15) into one of the cells | 0.667 |

5 -1SD=20

1. Calculate the z-score

 Z = x – Mean

 SD

Z = 12-35 / 15= -1.53

12

35

|  |  |
| --- | --- |
| calculating via using excel and typing in the following =STANDARDIZE(12,35,15) into one of the cells | -1.5333 |

1. What percent are below 12 ng/mL?

Using Munro appendix B pg 515 look up 1.5 under the ‘z’ column then go over to .03 and get value of 43.70. Now since this table indicates between zscore and mean ( visualize the area above marked by the blue dble head arrow) we need to subtract it from 50 (50-43.7= 6.3%) or since table is in percent move over the decimal places and get =0.063. [why 50 cause entire curve area=1 –definition of normal distribution so half of it is 50]

|  |  |
| --- | --- |
| calculating using excel and typing in the following =NORMSDIST(-1.53) | 0.0630 |

This makes sense as to what we visualized. Also note what would -1SD be 35-15=20 and -2SD would be 35-30 or 5 so we know a value of 12 is in between 1&2 SD and would fall between -2.15% and -13.5%.

Can also use the calculator found at https://www.zscorecalculator.com/

B. Estimate the percent of women who have levels above 45 ng/mL .

1SD=50 2SD=65

|  |  |
| --- | --- |
| calculating via using excel and typing in the following =STANDARDIZE(45,35,15) into one of the cells | 0.667 |

5 -1SD=20

1. Visualize it--sketch the mean and z-score
2. Calculate the z-score

Excuse the wiggle but this indicates what we want to estimate

Z = 45-35 / 15= .667

|  |  |
| --- | --- |
| calculating via using excel and typing in the following =STANDARDIZE(45,35,15) into one of the cells | 0.667 |

45

35

1. What percent are above 45 ng/mL?

Using Munro appendix B pg 515 look up .6 under the ‘z’ column then go over to .07 and get value of 24.86. Now since this table indicates between z-score and mean we need to add it from 50 (50+24.86= 75%) or since table is in percent move over the decimal places and get =0.75.

|  |  |
| --- | --- |
| calculating using excel and typing in the following =NORMSDIST(.667) | 0.748 |

But wait our question is what percent are above 45ng/mL. So we need to subtract the 75% from 1 (the area of a normal distribution) in order to say 25% are above 45ng/mL (75% are below). This is why it is always good to visualize what you want to get.

1. What vitamin D level coincides with 1 SD? 35+15=50 2SD=65 So our value of 45 is still within the +1SD value of 50 leaving at least 13.5% +2.15% +.13% + some of the 34.1% so the 25% of the sample above 45ng/mL makes sense.