

Measures of Central Tendency (Continued)

Recall that the three principal measures of central tendency are the mean, median, and mode. Which Measure is more appropriate?

Example 1: Describe the central tendency of each of the following monthly incomes for six sales people working on commission using the most appropriate measure.

- a) January: \$1241, \$1449, \$2020, \$1371, \$1622, \$1855 → \$1241, \$1371, \$1449, \$1622, \$1855, \$2020  
 b) February: \$1529, \$0, \$2121, \$1933, \$1686, \$1893 → \$0, \$1529, \$1686, \$1893, \$1933, \$2121  
 c) March: \$1752, \$2540, \$1392, \$1000, \$1000, \$1000 → \$1000, \$1000, \$1000, \$1392, \$1752, \$2540

Ans: a)  
 Mean =  $\frac{1241 + 1371 + 1449 + 1622 + 1855 + 2020}{6}$   
 $= \frac{9558}{6}$   
 $= 1593$   
 Median =  $\frac{1449 + 1622}{2}$   
 $= 1535.5$   
 There is no mode.  
 ∴ Both, the mean and the median are appropriate measures of central tendency.

b) Mean =  $\frac{0 + 1529 + 1686 + 1893 + 1933 + 2121}{6}$   
 $= \frac{9162}{6}$   
 $= 1527$   
 Median =  $\frac{1686 + 1893}{2}$   
 $= 1789.5$   
 There is no mode.  
 ∴ Salaries improved compared to the previous month, but there is an outlier (\$0). Since the outlier has a greater effect on the mean than the median, then the median would a more appropriate measure of central tendency.

c) Mean =  $\frac{3000 + 1392 + 1752 + 2540}{6}$   
 $= \frac{8684}{6}$   
 $= 1447.33$   
 Median =  $\frac{1000 + 1392}{2}$   
 $= 1196$   
 The mode is 1000.  
 ∴ The mode is a more appropriate measure of central tendency since half of the salaries are 1000.

Example 2: What mark must a student receive on the final exam to earn a final grade of 83% in Data Management?

	Weight	Received
Project	25%	80%
Exam	30%	
Tests	35%	78%
Quizzes, assignments	10%	85%

Example (to be done by students): Two car salesmen are competing for a mid-year bonus. The owner of the dealership wants to assess the better competitor. Who is the better candidate?

Monthly Sales

	Rahim	16	28	32	28	26	31
Johann	34	30	24	26	29	26	

Ex 2 Ans:

$$\bar{x} = \frac{\sum_{i=1}^n w_i x_i}{\sum_{i=1}^n w_i}, \quad \bar{x} = 83$$

$$\bar{x} = \frac{w_1 x_1 + w_2 x_2 + w_3 x_3 + w_4 x_4}{w_1 + w_2 + w_3 + w_4}$$

$$83 = \frac{25 \times 80 + 30x_2 + 35 \times 78 + 10 \times 85}{25 + 30 + 35 + 10}$$

$$83 = \frac{2000 + 30x_2 + 2730 + 850}{100}$$

$$83 \times 100 = \frac{5580 + 30x_2}{100}$$

$$83 \times 100 = 5580 + 30x_2$$

$$8300 = 5580 + 30x_2$$

$$8300 - 5580 = 30x_2$$

$$2720 = 30x_2$$

$$\frac{2720}{30} = \frac{30x_2}{30}$$

$$\boxed{x_2 = 90.7}$$

$\therefore$  The student needs to get approx. 90.7% on the final exam in order to end up with 83% in the course.