STATISTICS: MEAN, MEDIAN, MODE [PIRNOT 14.2]

EX 14.2.3: Given the following data set:

$$7, 5, 3, 8, 4, 1, 2, 5, 2, 8, 7, 5, 7, 6, 8$$

(a) Compute the mean of the data set.

$$\overline{x} = \frac{\sum x}{n} = \frac{7+5+3+8+4+1+2+5+2+8+7+5+7+6+8}{15} = \frac{78}{15} = \boxed{5.2}$$

(b) Compute the median of the data set.

1st Sort the data in **ascending** order: 1,2,2,3,4,5,5,5,6,7,7,7,8,8,8

Since $n = 15$ is **odd**, the median is the **middle value** of the **sorted** data set.

$\therefore$ Median $=$ (Middle value of **sorted** data set) $= \boxed{5}$

(c) Compute the mode of the data set (if it exists).

The most frequent values are 5,7,8.

$\therefore$ Since there are more than two most frequent values, there is $\boxed{\text{no mode}}$

EX 14.2.5: Given the following frequency distribution:

DATA VALUE	FREQUENCY	LAST POSITION
(x)	(f)	
5	9	$\mathbf{9^{th}}$
8	4	$9+4 = \mathbf{13^{th}}$
11	3	$13+3 = \mathbf{16^{th}}$
14	8	$16+8 = \mathbf{24^{th}}$
21	9	$24+9 = \mathbf{33^{rd}}$

(a) Compute the mean of the frequency distribution.

$$\overline{x} = \frac{\sum(x \cdot f)}{\sum f} = \frac{(5)(9)+(8)(4)+(11)(3)+(14)(8)+(21)(9)}{9+4+3+8+9} = \frac{411}{33} \approx \boxed{12.4545}$$

(b) Compute the median of the frequency distribution.

1st Build a third column of table called **LAST POSITION**.   (see above table)

The entries in the third column mean that when **sorted** in **ascending** order:

The data value 5 occurs in the 1st through 9th positions

The data value 8 occurs in the 10th through 13th positions

The data value 11 occurs in the 14th through 16th positions

The data value 14 occurs in the 17th through 24th positions

The data value 21 occurs in the 25th through 33rd positions

Since $\sum f = 33$ is **odd**, the median is the $\left\lceil \dfrac{\sum f}{2} \right\rceil$-th position in **sorted** data set.

$\left\lceil \dfrac{\sum f}{2} \right\rceil = \left\lceil \dfrac{33}{2} \right\rceil = \lceil 16.5 \rceil = 17 \implies$ Median $=$ (17th value of **sorted** data set) $= \boxed{14}$

(c) Compute the mode of the frequency distribution (if it exists).

Data values with the highest frequency are 5 and 21 $\implies$ The modes are $\boxed{\text{5 and 21}}$