Homework assignment 3A, Solution

1. A dental supplies distributor ships a customer 50 boxes of product A, 30 boxes of B, 60 boxes of C, and 20 boxes of D. The unit shipping costs (dollars per box) for the four products are $5, $2, $4, and $10, respectively. What is the weighted mean for shipping cost per unit?

Answer

$$\bar{x}_w = \frac{5(50) + 2(30) + 4(60) + 10(20)}{50 + 30 + 60 + 20} = \$4.69$$

2. The 2007 top-grossing feature film was Spiderman 3, a product that brought in $336.5 million at the box office. The gross receipts for this and the rest of the top- 20 feature films of that year are shown below. Determine the mean and median for these data. Is there a mode? If so, what is its numerical value?

$336.5 , $322.7 , $319.2 , $309.4 , $292.0 , $256.4 , $227.5 , $219.5 , $217.3 , $210.6 , $206.4 , $183.1 , $168.3 , $148.8 , $143.5 , $140.1 , $134.5 , $131.9 , $130.2 , $127.8

Answer

$$\bar{x} = \frac{4225.7}{20} = 211.285$$

$$\text{Median} = \frac{206.4 + 210.6}{2} = 208.5$$

There is no mode (Technically, each observation is a mode here.)

3. The table below documents the maximum speeds (in mph) for a sample of animals. Based on data in the table, determine:

- The average maximum speed.

- The median maximum speed.

- The mode maximum speed.

- The range of maximum speed.

- The mean absolute deviation of maximum speed.

- The variance of maximum speed.

- The standard deviation of the maximum speed.

- Let z represents standardized maximum speed data. Calculate z for each animal, and show that its mean $\bar{z} = 0$ and that its standard deviation of $s_z = 1$

Animal	Maximum Speed
Cheetah	70
Antelope	61
Wildebeest	50
Lion	50
Coyote	43
Donkey	40
Giraffe	32
Wart hog	30
Deer	30
Bear	30
Cat	30
Human	27.89
Elephant	25
Black mamba	20
Squirrel	12
Spider	1.17
Giant tortoise	0.17
Garden snail	0.03

Answer Median = Mode = 30, and Range = 69.7. See table below for Mean, MAD, Variance, and the Standard Deviation.

Animal	Max Speed	$x_i - \bar{x}$	$|x_i - \bar{x}|$	$(x_i - \bar{x})^2$
Garden Snail	0.03	-30.65	30.65	939.49
Giant Tortoise	0.17	-30.51	30.51	930.93
Spider	1.17	-29.51	29.51	870.91
Squirrel	12	-18.68	18.68	348.98
Black Mamba	20	-10.68	10.68	114.09
Elephant	25	-5.68	5.68	32.28
Human	27.89	-2.79	2.79	7.79
Wart Hog	30	-0.68	0.68	0.46
Deer	30	-0.68	0.68	0.46
Bear	30	-0.68	0.68	0.46
Cat	30	-0.68	0.68	0.46
Giraffe	32	1.32	1.32	1.74
Donkey	40	9.32	9.32	86.84
Coyote	43	12.32	12.32	151.76
Wildebeest	50	19.32	19.32	373.22
Lion	50	19.32	19.32	373.22
Antelope	61	30.32	30.32	919.24
Cheetah	70	39.32	39.32	1545.98
$\sum$	552.26	0.00	262.46	6698.30
	$\bar{x} = 30.68$		MAD $= 14.58$	$s^2 = 394.02$
				$s = 19.85$