Statistics

Data Description (frequency distribution, mean, median, mode, variance, standard deviation)

1. a) Mode $_F$ = 1, Mode $_A$ = 2

b) Because the number of data is even, the median will be the average value of the 97th and 98th observations for Fontainebleau, which are 2 and 2, so Median $_F$ = 2.

For Avon, the median is given by the average value of the 85th and 86th observations which are 3 and 3, so Median $_A$ = 3.

2. a) The complete data can be found in Table 1.

Miles per gallon	Number of Vans	Relative Frequency	Cumulative Frequency
6.0 – under 8.0	6	0.06	6
8.0 – under 10.0	23	0.23	29
10.0 – under 12.0	34	0.34	63
12.0 – under 14.0	17	0.17	80
14.0 – under 16.0	12	0.12	92
16.0 – under 18.0	8	0.08	100
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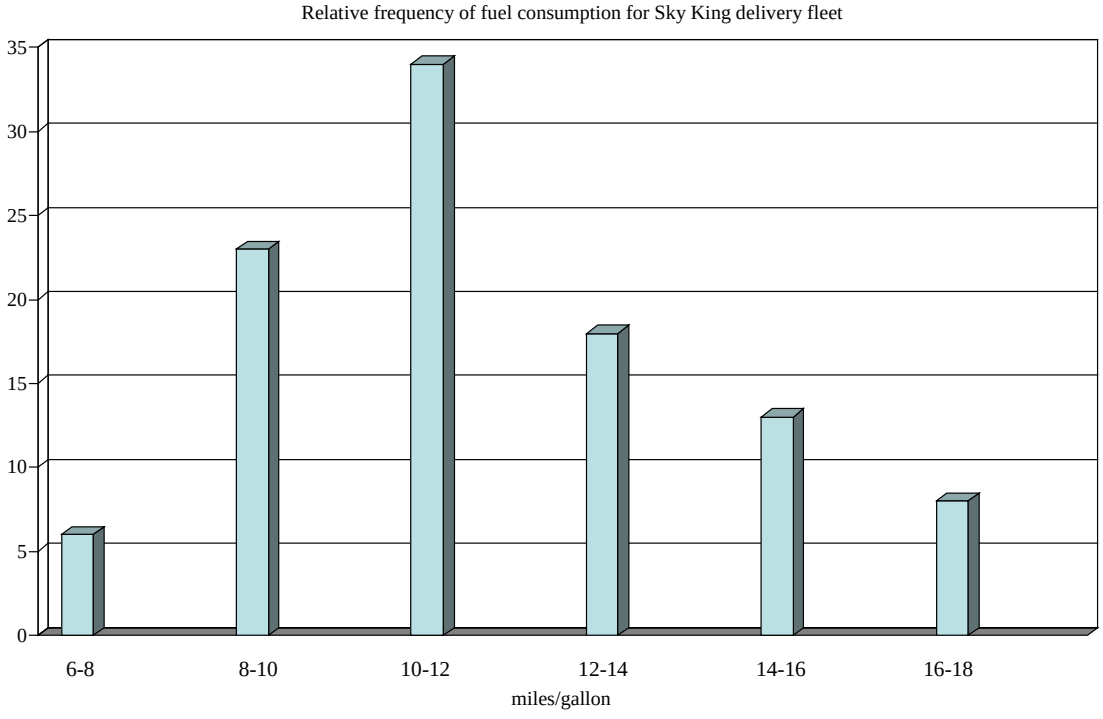
Totals	100	100	

Table 1: Fuel consumption data

b) The histogram is shown below:



3. Construct an absolute and relative frequency distribution using the data of Table 3.

Life Expectancy	Abs. Freq.	Rel. Freq.
41	2	0.08
42	0	0
43	7	0.28
44	6	0.24
45	0	0
46	0	0
47	10	0.4
	25	1.0

Probability

1. a) Let X be the number that occurs on the top of the dice.

We need to find $P(X>4)$.

Observe that $P(X>4)=P(X=5)+P(X=6) = 1/6+1/6=2/6=1/3$.

Answer: 1/3.

b) Expected value is given by

$$\mathrm{E[X]} = \sum_i x_i\, p(x_i) = 1*1/6 + 2*1/6 + 3*1/6 + 4*1/6 + 5*1/6 + 6*1/6$$

$$= (1+2+3+4+5+6)/6 = 3.5.$$

Answer: On average, we'll observe 3.5.

c) Variance is given by

$$\sigma^2_{\mathrm{X}} = \mathrm{Var(X)} = \sum_i (x_i - E[X])^2\, p(x_i)$$

$$= (1-3.5)^2 *1/6 + (2-3.5)^2 *1/6 + (3-3.5)^2 *1/6 + (4-3.5)^2 *1/6 + (5-3.5)^2 *1/6 + (6-3.5)^2 *1/6$$

$$= (2.5^2 + 1.5^2 + 0.5^2 + 0.5^2 + 1.5^2 + 2.5^2)/6 = 2.92.$$

Answer: 2.92.

d) Standard deviation is given by $\sigma_{\mathrm{X}} = \sqrt{Var(X)} = \sqrt{2.92} = 1.71$.