

## Test 1 Study Guide Solutions

- sample
  - population
  - sample
  - population

- qualitative
  - quantitative, continuous
  - quantitative, discrete
  - qualitative

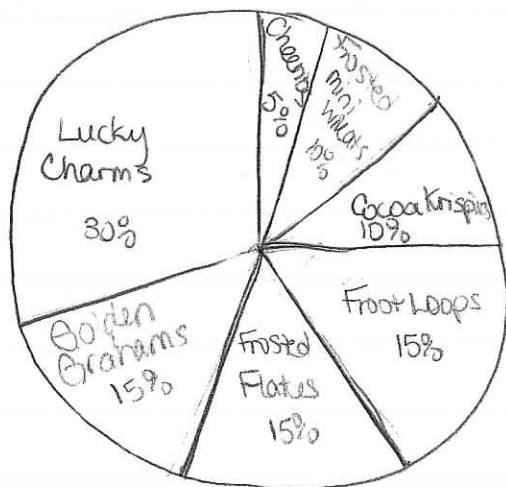
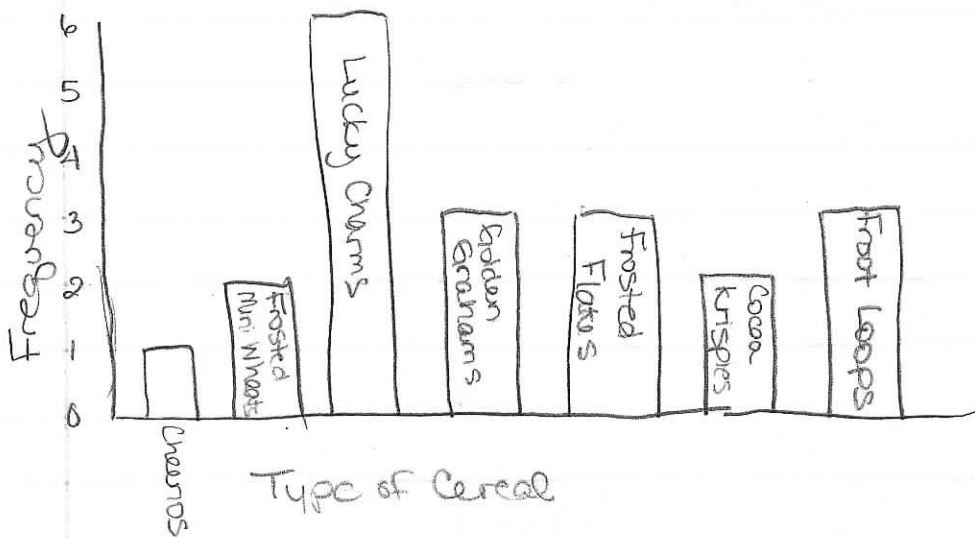
- time-series
  - time-series
  - cross-section
  - cross-section

4. (a)  $\sum x = 6 + 11 + 3 + 5 + 6 + 2 = \boxed{33}$

(b)  $(\sum x)^2 = 33^2 = \boxed{1089}$

(c)  $\sum x^2 = 6^2 + 11^2 + 3^2 + 5^2 + 6^2 + 2^2 = \boxed{231}$

5. Favorite Cereal	Frequency	Relative Freq.	% Freq.
Cheerios	1	$\frac{1}{20} = .05$	5%
Frosted mini Wheats	2	$\frac{2}{20} = .1$	10%
Lucky Charms	6	$\frac{6}{20} = .3$	30%
Golden Grahams	3	$\frac{3}{20} = .15$	15%
Frosted Flakes	3	$\frac{3}{20} = .15$	15%
Cocoa Krispies	2	$\frac{2}{20} = .1$	10%
Froot Loops	3	$\frac{3}{20} = .15$	15%
	20	1	100



$$\text{Cheerios } .05 \cdot 360 = 18^\circ$$

$$\text{Lucky Charms } = .3 \cdot 360 = 108^\circ$$

$$\text{Frosted mini Wheats } = .1 \cdot 360 = 36^\circ$$

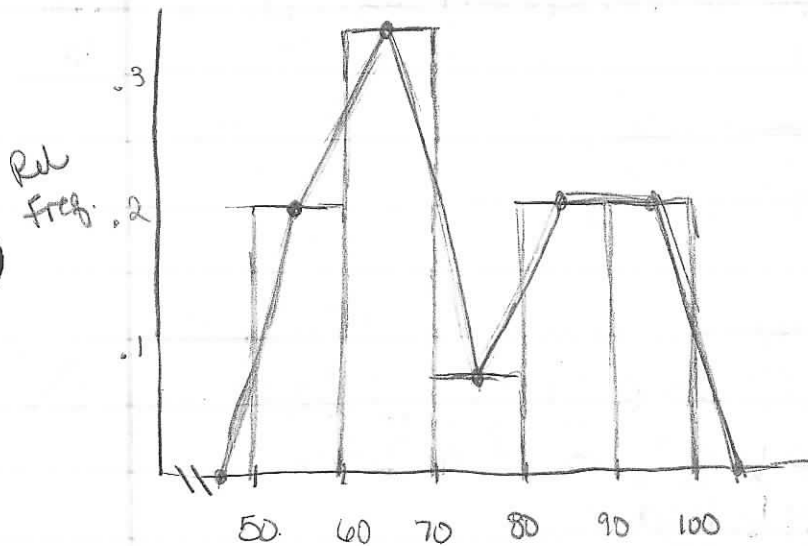
$$\text{Golden Grahams } = .15 \cdot 360 = 54^\circ$$

$$\text{Frosted Flakes } = .15 \cdot 360 = 54^\circ$$

$$\text{Cocoa Krispies } = .1 \cdot 360 = 36^\circ$$

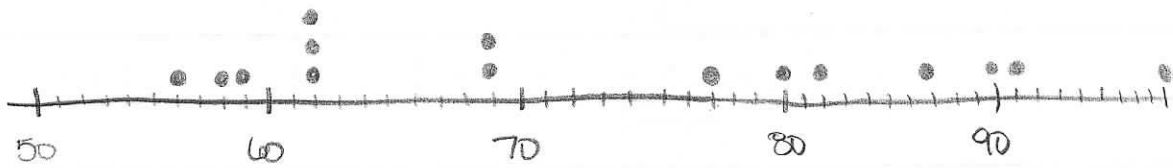
$$\text{Froot Loops } = .15 \cdot 360 = 54^\circ$$

6. Class	Frequency	Rel Freq	% Freq	Class Boundaries	Class Width	Class Midpt
50-59	3	.2	20	49.5 to less than 59.5	10	54.5
60-69	5	.333	33.3	59.5 to less than 69.5	10	64.5
70-79	1	.067	6.7	69.5 to less than 79.5	10	74.5
80-89	3	.2	20	79.5 to less than 89.5	10	84.5
90-99	3	.2	20	89.5 to less than 99.5	10	94.5
	15	1	100			



Class	Cumulative Frequency	Cumulative Rel Freq	Cumulative % Freq
50-59	3	.2	20
50-69	8	.533	53.3
50-79	9	.6	60
50-89	12	.8	80
50-99	15	1	100

5	6 8 9
6	2 2 2 9 9
7	7
8	0 2 7
9	0 1 9



$$\bar{x} = \frac{1103}{15} = \boxed{73.533}$$

20% trimmed mean

~~56~~ ~~58~~ ~~59~~ 62 62 62 69 69 77 80 82 87 ~~90~~ ~~91~~ ~~99~~

$15 \times .20 = 3$  so trim 3 from each side

$$\bar{x} = \frac{650}{9} = \boxed{72.222}$$

Median =  $\boxed{69}$

Mode =  $\boxed{62}$

Range =  $99 - 56 = \boxed{43}$

$$s^2 = \frac{83839 - \frac{(1103)^2}{15}}{15 - 1} = \boxed{195.124}$$

$$s = \sqrt{195.124} = \boxed{13.969}$$

$$\bar{x} - 2s = 73.533 - 2 \cdot 13.969 = 45.595$$

$$\bar{x} + 2s = 73.533 + 2 \cdot 13.969 = 101.471$$

Scores within 2 standard deviations of mean:  $\boxed{46-100}$

56 58 59  $\overset{Q_1}{(62)}$  62 62 69  $\overset{Q_2}{(69)}$  77 80 82  $\overset{Q_3}{(87)}$  90 91 99

$$Q_1 = \boxed{62}$$

$$Q_3 = \boxed{87}$$

$$IQR = Q_3 - Q_1 = 87 - 62 = \boxed{25}$$

$$P_{60} = \frac{60 \cdot 15}{100} = 9^{\text{th}} \text{ term} \Rightarrow \boxed{77}$$

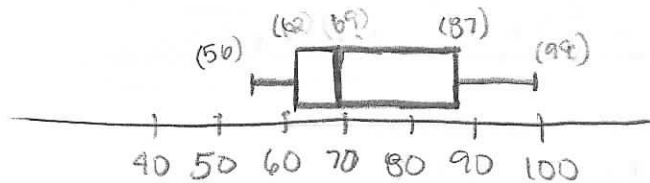
\* Type of Study Guide in Class: Should read "Find the percentile rank of 59."

$$\text{Percentile Rank of } 59 = \frac{\text{Percentile Rank of } x_3}{15} \times 100 = \boxed{13.3\%}$$

### Box & Whisker Plot

$$\text{Lower Inner Fence: } Q_1 - 1.5 \times IQR = 62 - 1.5 \cdot 25 = 24$$

$$\text{Upper Inner Fence: } Q_3 + 1.5 \times IQR = 87 + 1.5 \cdot 25 = 124.5$$



$$7. \bar{x} = \frac{\sum mf}{n} = \frac{620}{50} = \boxed{12.4 \text{ min}}$$

Time	# Students	m	mf	m <sup>2</sup> f
0-<4	1	2	2	4
4-<8	7	6	42	252
8-<12	15	10	150	1500
12-<16	18	14	252	3528
16-<20	6	18	108	1944
20-<24	3	22	66	1452
	50		620 ↑ Σmf	8680 ↑ Σm <sup>2</sup> f

$$s^2 = \frac{\sum m^2 f - \frac{(\sum mf)^2}{n}}{n-1} = \frac{8680 - \frac{620^2}{50}}{50-1} = \boxed{20.245}$$

$$s = \sqrt{20.245} = \boxed{4.499 \text{ min}}$$

Sample Statistics