

Panel 1

Last time

Frequency distribution

Histogram (freq. table + bins)

$$\text{Mean (avg)} = \frac{1}{n} \sum x_i = \frac{\bar{x} (\text{sample})}{n (\text{pop.})}$$

Median (middle #)

Mode (most frequent)

Which applies when?

numeric: all 3ordinal: med + modenominal: mode

1

Panel 2

Work sheet on Distributions and Histograms

14.5

22.7

30

59

22 — 100000

500

$$\bar{x} = 39,640$$

$$\text{median} = 30000$$

$$\bar{x} = 519!$$

$$\text{median} = 30000$$

2

Panel 3

Name: _____

Quiz # 2

① Consider the following data values obtained from a random sample: 6, 4, 1, 2, 5, 6

Find

a) the mean $\bar{x} =$ _____

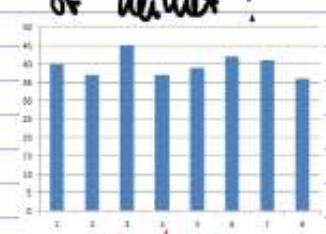
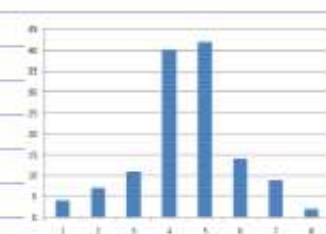
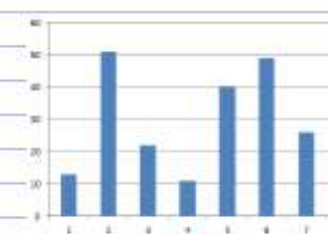
b) the median median = _____

c) the mode(s) mode(s): _____

3

Panel 4

② Classify the distributions as homogeneous, heterogeneous, or neither?

hetero
homog.
neither

③ Create a histogram with 3 bins for the data 1, 5, 9, 3, 3, 6, 8, 3, 5, 10

min: 1

max: 10

bin width: $\frac{10-1}{3} = \frac{9}{3} = 3$

| bin | count | % |
|------|-------|----|
| 1-5 | 4 | 40 |
| 5-9 | 7 | 70 |
| 9-13 | 3 | 30 |

4

Panel 5

Measures of Central Tendency for Tables:

| | |
|------------|-----|
| (1) male | 60% |
| (2) female | 40% |

~~mean~~ Nominal
~~median~~
 mode: most frequent category
male

| | | % | cummulative % |
|-----------|----|------|---------------|
| very good | 15 | 0.15 | 0.15 |
| good | 20 | 0.2 | 0.35 |
| avg | 30 | 0.3 | 0.65 |
| bad | 20 | 0.2 | 0.85 |
| very bad | 15 | 0.15 | 1.00 |

mode = "avg" category
 median = first category above 50%, i.e. "avg"
 mean = let's see

5

Panel 6

| | code | count | % | cumm % | (cat. code) * (count) |
|-----------|----------|------------|------------|---------|-----------------------|
| very good | <u>1</u> | <u>10</u> | 10/120 | 10/120 | 10 |
| good | <u>2</u> | <u>30</u> | 30/120 | 40/120 | 60 |
| avg. | <u>3</u> | <u>40</u> | 40/120 | 80/120 | 120 |
| bad | <u>4</u> | <u>30</u> | 30/120 | 110/120 | 120 |
| very bad | <u>5</u> | <u>10</u> | 10/120 | 120/120 | 50 |
| | | <u>120</u> | <u>100</u> | | <u>360</u> |

mean: $\frac{360}{120} = \underline{3}$

6

Panel 7

| | count | freq. | cum % | coll Data | 1, 5, 9, 3, 3, 6, 8, 3, 5, 10 |
|------|-----------|----------|-------|-----------|-------------------------------|
| 1-4 | 4 | 40% | 40 | 2.5 | 2.5 · 8.40 |
| 4-7 | 3 | 30% | 70 | 5.5 | 5.5 · 8.30 |
| 7-10 | 3 | 30% | 100 | 8.5 | 8.5 · 8.20 |
| | <u>10</u> | <u>1</u> | | | <u>520</u> |

Mode: "1-4" category

Median: "4-7" category

Mean: $\frac{520}{10} = 52$

Homogeneous or heterogeneous distribution?

Histogram

Panel 8

| HIGHEST DEGREE | Frequency | Relative Frequency |
|--------------------|-----------|--------------------|
| 0 - Less than HS | 297 | 0.14688428 |
| → 1 - High School | 1003 | 0.49604353 |
| 2 - Junior College | 173 | 0.08558854 |
| 3 - Bachelor | 355 | 0.17556874 |
| 4 - Graduate | 194 | 0.095944606 |

0.14
0.63

mode = HS
median = HS
~~mean =~~

Panel 9

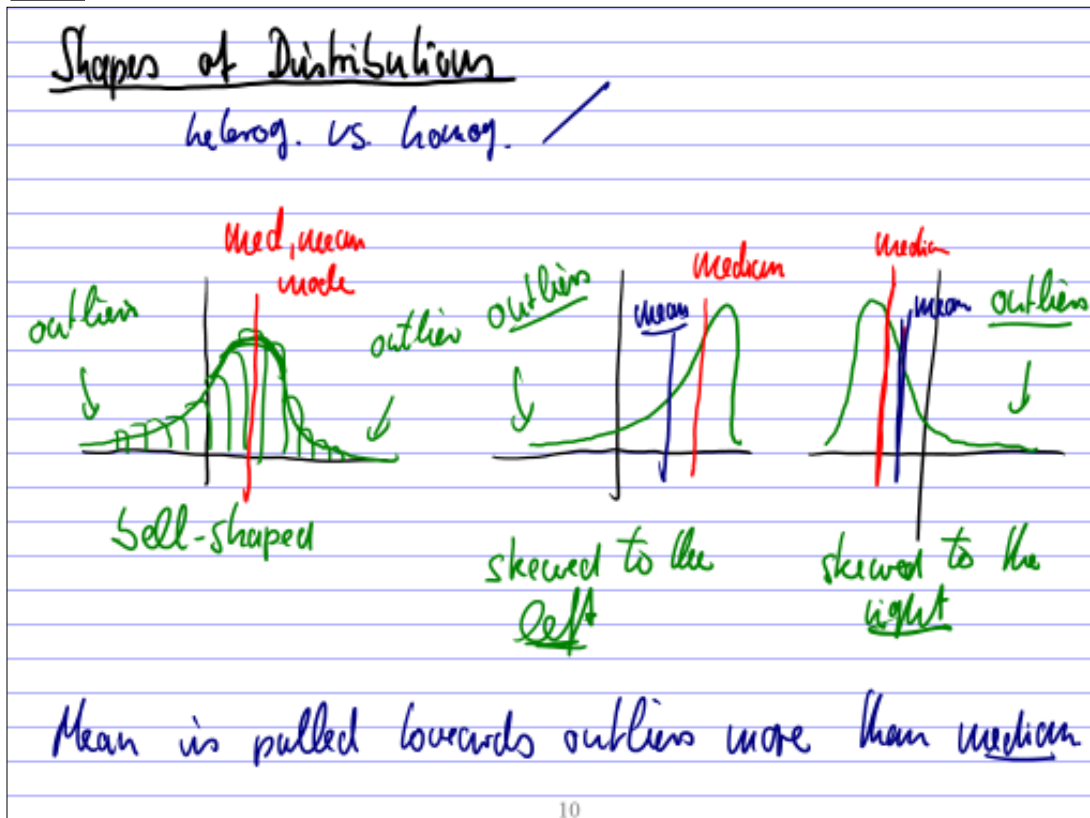
| Frequency table results for INCOME: | | | <i>cum</i> |
|-------------------------------------|-----------|--------------------|------------|
| INCOME | Frequency | Relative Frequency | <i>%</i> |
| 01 - Under \$1,000 | 22 | 0.018502943 | |
| 02 - \$1,000 to \$2,999 | 39 | 0.032800674 | |
| 03 - \$3,000 to \$3,999 | 27 | 0.022708159 | |
| 04 - \$4,000 to \$4,999 | 13 | 0.0109335575 | |
| 05 - \$5,000 to \$5,999 | 19 | 0.015979815 | |
| 06 - \$6,000 to \$6,999 | 16 | 0.013456686 | |
| 07 - \$7,000 to \$7,999 | 18 | 0.015979815 | |
| 08 - \$8,000 to \$9,999 | 24 | 0.02018503 | |
| 09 - \$10,000 to \$12,499 | 48 | 0.04037006 | |
| 10 - \$12,500 to \$14,999 | 63 | 0.0529857 | |
| 11 - \$15,000 to \$17,499 | 40 | 0.033641715 | |
| 12 - \$17,500 to \$19,999 | 42 | 0.035323802 | |
| 13 - \$20,000 to \$22,499 | 44 | 0.037005886 | |
| 14 - \$22,500 to \$24,999 | 76 | 0.06391926 | |
| 15 - \$25,000 to \$29,999 | 70 | 0.058873 | |
| 16 - \$30,000 to \$34,999 | 94 | 0.07905803 | |
| 17 - \$35,000 to \$39,999 | 71 | 0.059714045 | |
| 18 - \$40,000 to \$49,999 | 125 | 0.10513036 | <i>G</i> |
| 19 - \$50,000 to \$59,999 | 85 | 0.07148885 | |
| 20 - \$60,000 to \$74,999 | 87 | 0.07317073 | |
| 21 - \$75,000 to \$89,999 | 61 | 0.051303618 | |
| 22 - \$90,000 to \$109,999 | 38 | 0.03195963 | |
| 23 - \$110,000 to \$129,999 | 28 | 0.023549201 | |
| 24 - \$130,000 to \$149,999 | 6 | 0.0050462573 | |
| 25 - \$150,000 or over | 32 | 0.026913373 | |

Mode: \$40-\$50

Median: HW

Mean: 75k, because 5th sides are unequal

Panel 10



Panel 11

Mean vs. Median (and Mode)

If distribution has median = 55 and
mean = 43

is it bell-shaped (A)
 skewed left (B)
 skewed right (C)