

Problem Set 1.5: Bar Graphs and Histograms

Note: For this problem set assume that histograms include the left endpoint of the interval and not the right. This is the default for most software.

1. The histogram below gives the percent of people living below the poverty level for each state in the US. In 2008, 13.2% of people in the US were living below the poverty level with Mississippi at 21.2% and New Hampshire at 7.6%.

a) In what interval of the histogram does Mississippi lie? Give your answer in double inequality notation.

$$21\% \leq x < 22\%$$

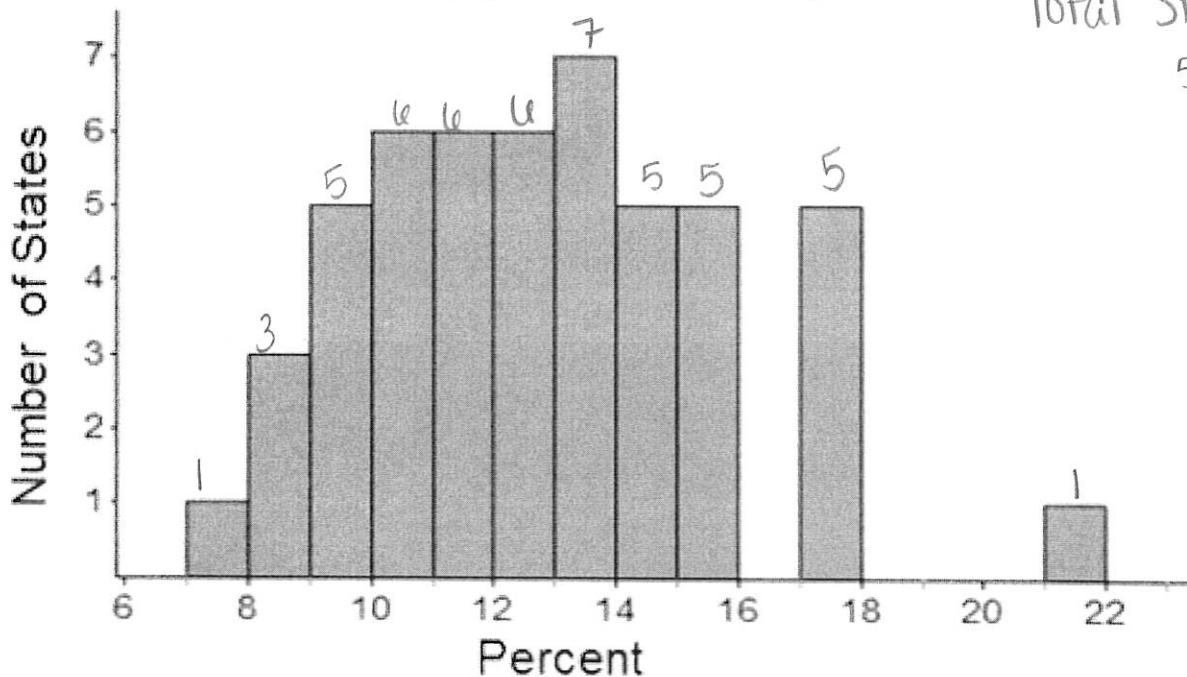
b) Write a sentence that gives meaning to the tallest bar of the histogram.

7 states had $13\% \leq x < 14\%$ of their people living below the poverty level in 2008.

c) What percent of states have a poverty level $\geq 17\%$?

$$6/50 = 0.12 \quad \boxed{12\%}$$

Percent of People Living Below the Poverty Level
(by State in 2008)



Total States:
50

Source: Census Bureau, Poverty, <http://www.census.gov/compendia/statab/2012/ranks/rank34.html> 12/26/11

2) The histogram below gives the percent of people who own a firearm for each state in the US.

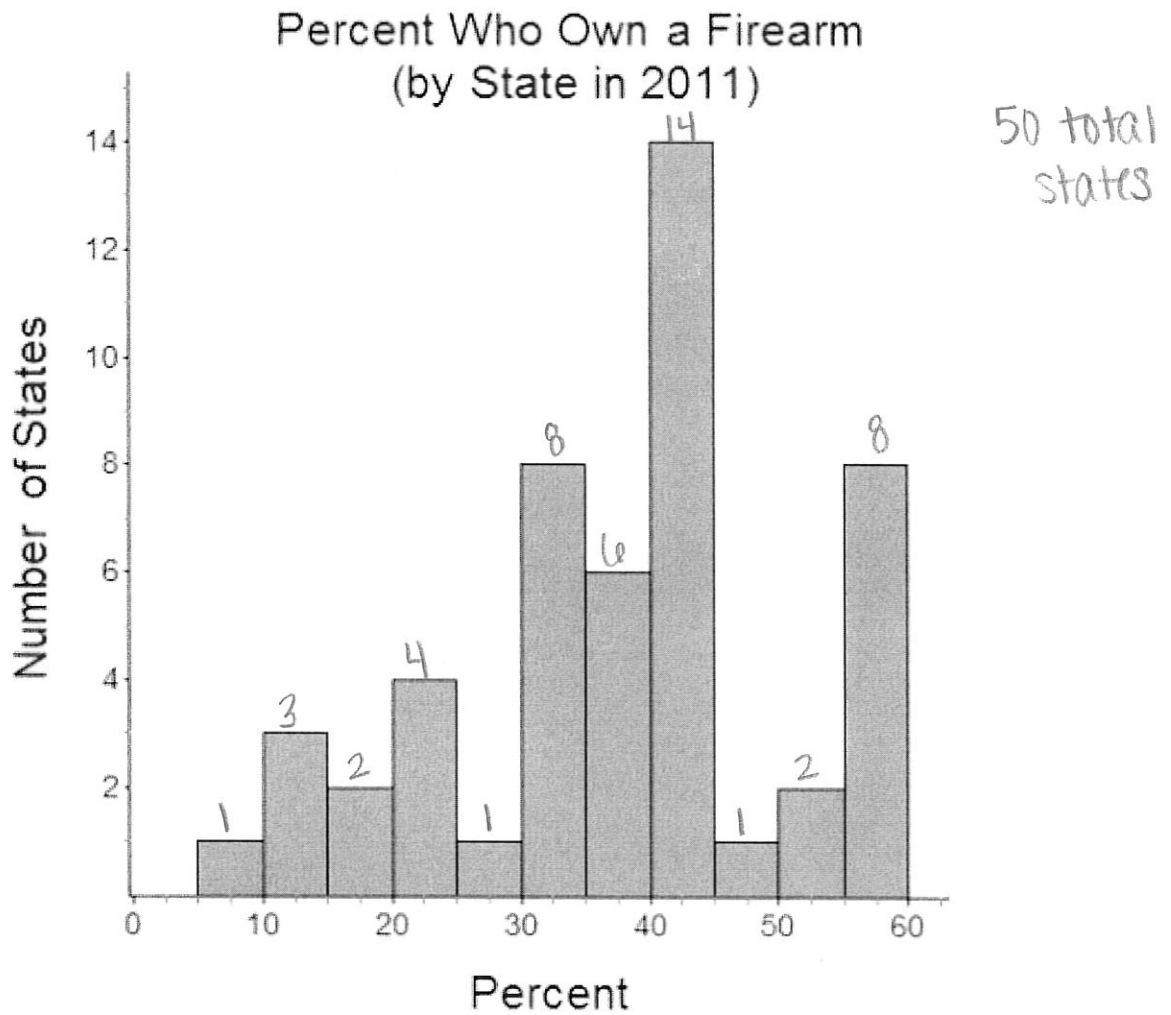
a) If in a state exactly 30% of the population owned a firearm, in what interval would it lie? Give your answer in double inequality notation.

$$30 \leq x < 35$$

b) In what percent of states did at least 40% of their citizens own a firearm?

$$\frac{14+1+2+8}{50} = \frac{25}{50} = 0.5$$

$$50\%$$

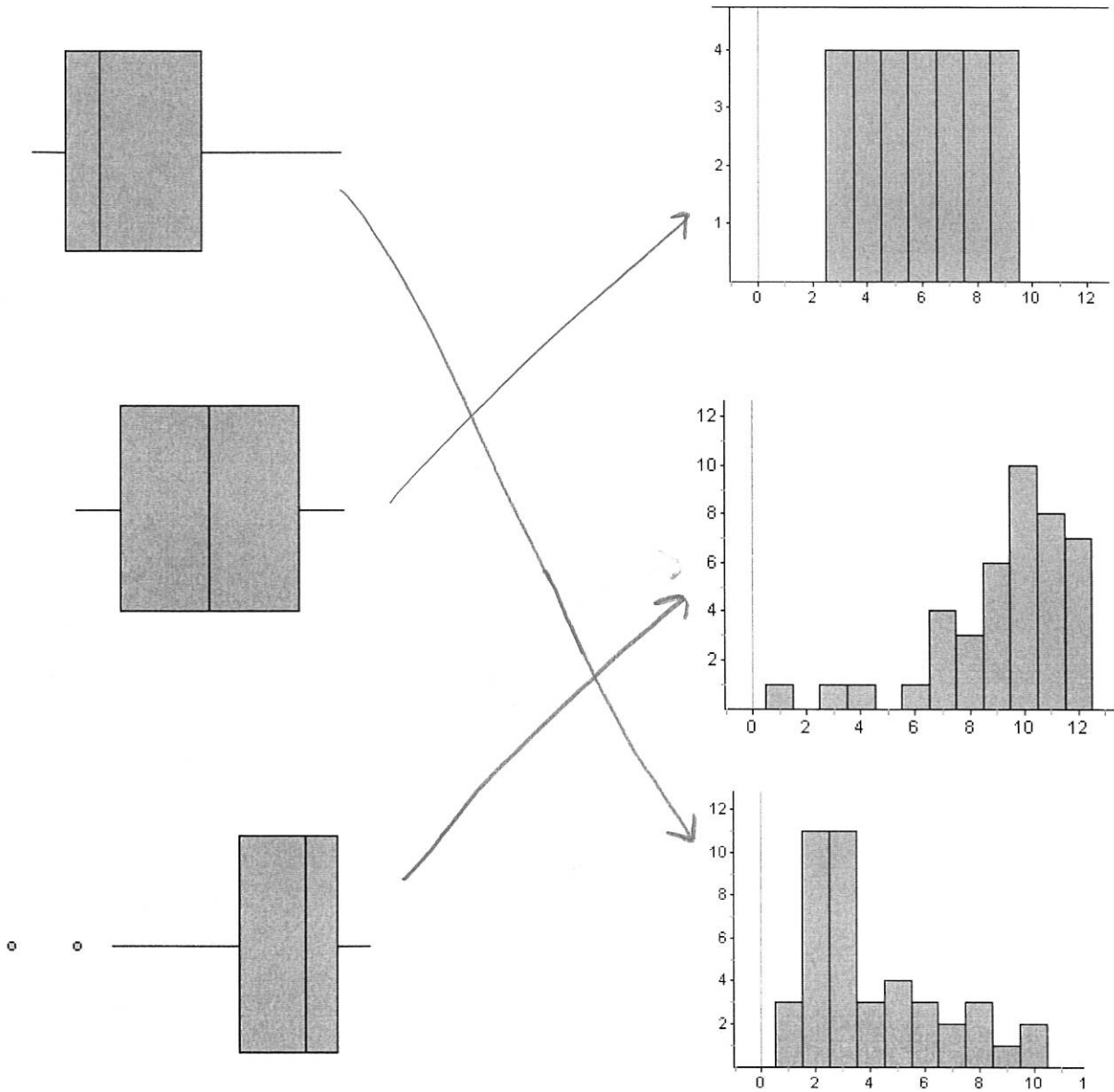


Source: NC Health Statistics, Firearms, <http://www.schs.state.nc.us/SCHS/brfss/2001/us/firearm3.html>, 12/26/2011

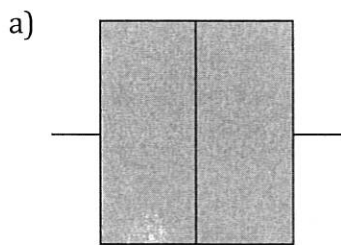
3. Three sets of data are displayed in both a box plot and a histogram. Use a line to match the box plot and histogram that have the same data.

BOXPLOTS

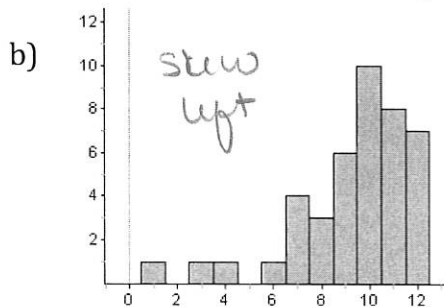
HISTOGRAMS



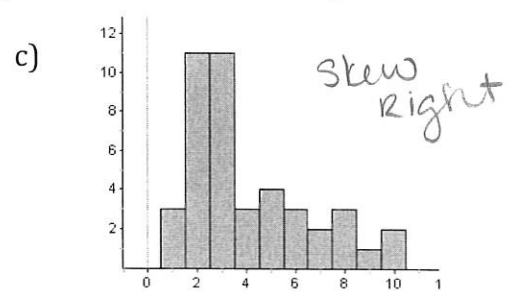
4. For each display, describe how the mean relates to the median (bigger, smaller, or the same).



mean would be the same as the median



mean < median



mean > median

5. 🍏 Open the Fathom file called "US Health Ins. Coverage".

a) Analyze the data for the variable "Percent Not Covered". (Remember "Analyze the data" requires you to identify **shape, mean, 5 number summary, and outliers.**)

skew right
mean: 15.1

min: 9
Q₁: 11.8
med: 14.7
Q₃: 17.5
max: 24.5

outliers:

upper:

$$17.5 + 8.55 = 26.05 \quad \boxed{\text{none}}$$

lower:

$$11.8 - 8.55 = 3.25 \quad \boxed{\text{none}}$$

$$\text{IQR} = 5.7$$
$$1.5 \text{IQR} = 8.55$$

b) Create a histogram for the variable "Percent not Covered". What is the appropriate minimum and maximum bin width (there is no exact answer to this question)?

0.5 - 2 would be acceptable.

c) If your intention is to point out that Texas and Arizona have a problem with a high percentage of people not covered by health insurance, would you use the minimum or maximum bin width? Why?

you would use a smaller bin width b/c it would set those states apart from the others.

6. 🍏 Open the Fathom file called "Football Runs."

a) Analyze the data.

skewed right
mean: 7.9

min: 0
Q₁: 1
med: 2.5
Q₃: 6.5
max: 99

outliers

upper:

$$6.5 + 8.25 = 14.75$$

$\boxed{22 \ \& \ 99}$

lower:

$$1 - 8.25 = -7.25$$

$\boxed{\text{none}}$

$$\text{IQR} = 5.5$$
$$1.5 \text{IQR} = 8.25$$

b) If you were NMH and trying to downplay how well Dan Schriber did, what measure of center would you use and why?

I would use the median b/c it is lower it isn't affected by the 2 upper outliers.

c) What is an example of a bin width that does not make sense for these data?

a bin width of 30 would make not sense b/c all runs except 99 would be in the same bin

d) What seems to be the optimal bin width for these data?

1 or 2