

STA1013 : Practice Problems for Quiz 2

1. For the numbers 2, 23, 15, 23, 26, 9, 24, 22, 11, 9, 23, which of the following is true?

1. _____

A. median $>$ mode $>$ mean

B. mean $>$ median $>$ mode

C. mode $>$ mean $>$ median

D. mode $>$ median $>$ mean

2. Randall has 32 credits with a grade of A, 21 credits with a grade of B, and 9 credits with a grade of C. What is his grade point average (GPA)? Base the GPA on values of 4.0 points for an A, 3.0 points for a B, and 2.0 points for a C.

2. _____

3. **(Means, Medians, Mode with binned Data)** Assume middle value in the bin represents all the data values in the bin.

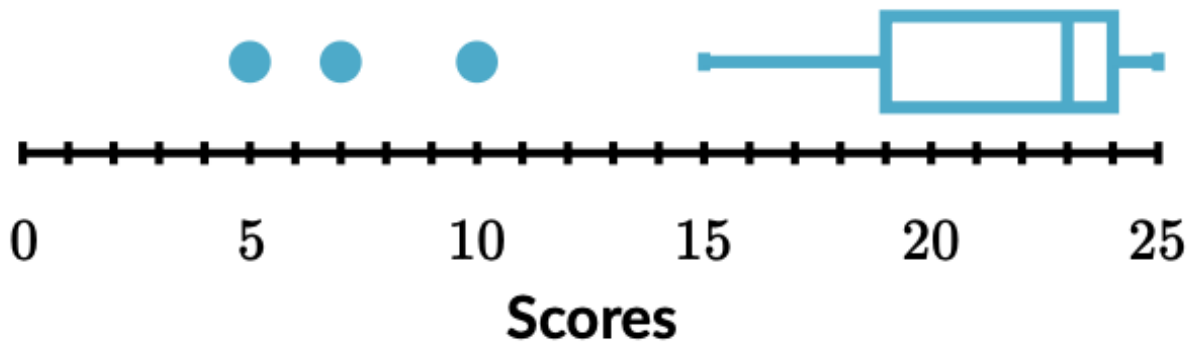
| bin | Frequency |
|-------|-----------|
| 0–6 | 10 |
| 7–13 | 10 |
| 14–20 | 10 |
| 21–27 | 20 |

- (a) Find the mean
- (b) Find the median class
- (c) Find the mode
4. **(Application of the weighted mean)** Voting in corporate elections is usually weighted by the amount of stock owned by each voter. Suppose a company has five stockholders who vote on whether the company should embark on a new advertising campaign. The votes (Y = yes, N = no) are as follows:

| Stockholder | Shares owned | Vote |
|-------------|--------------|------|
| A | 225 | Y |
| B | 170 | Y |
| C | 275 | Y |
| D | 500 | N |
| E | 90 | N |

According to the company's bylaws, the measure needs 60% of the vote to pass. Does it pass?

5. The boxplot displays the test scores.

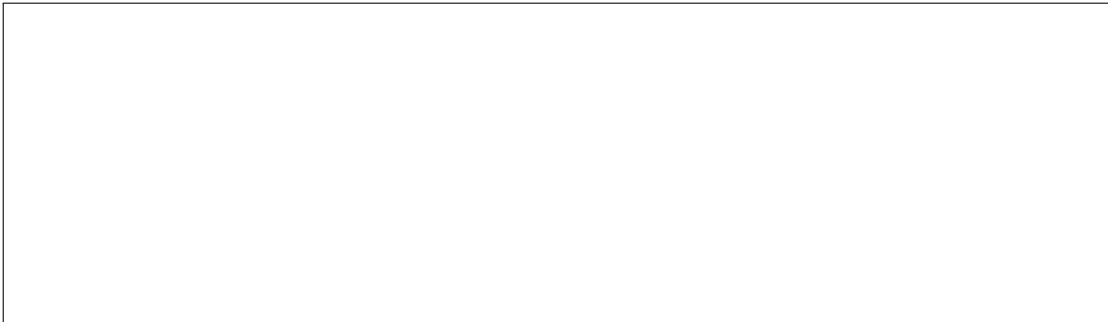


- (a) The shape of boxplot tells us that distribution of the data is (left-skewed / roughly symmetric / right-skewed). (circle one)
- (b) What is the range?
- (c) What is the five-number summary?
- (d) What is the interquartile range?
- (e) Half of the scores are less than _____
- (f) What percent of the scores are between 23 and 24?
- (g) What percent of the scores are between 5 and 24?
- (h) What percent of the scores are between 5 and 25?
- (i) 25% of scores are less than _____
- (j) 25% of scores are higher than _____

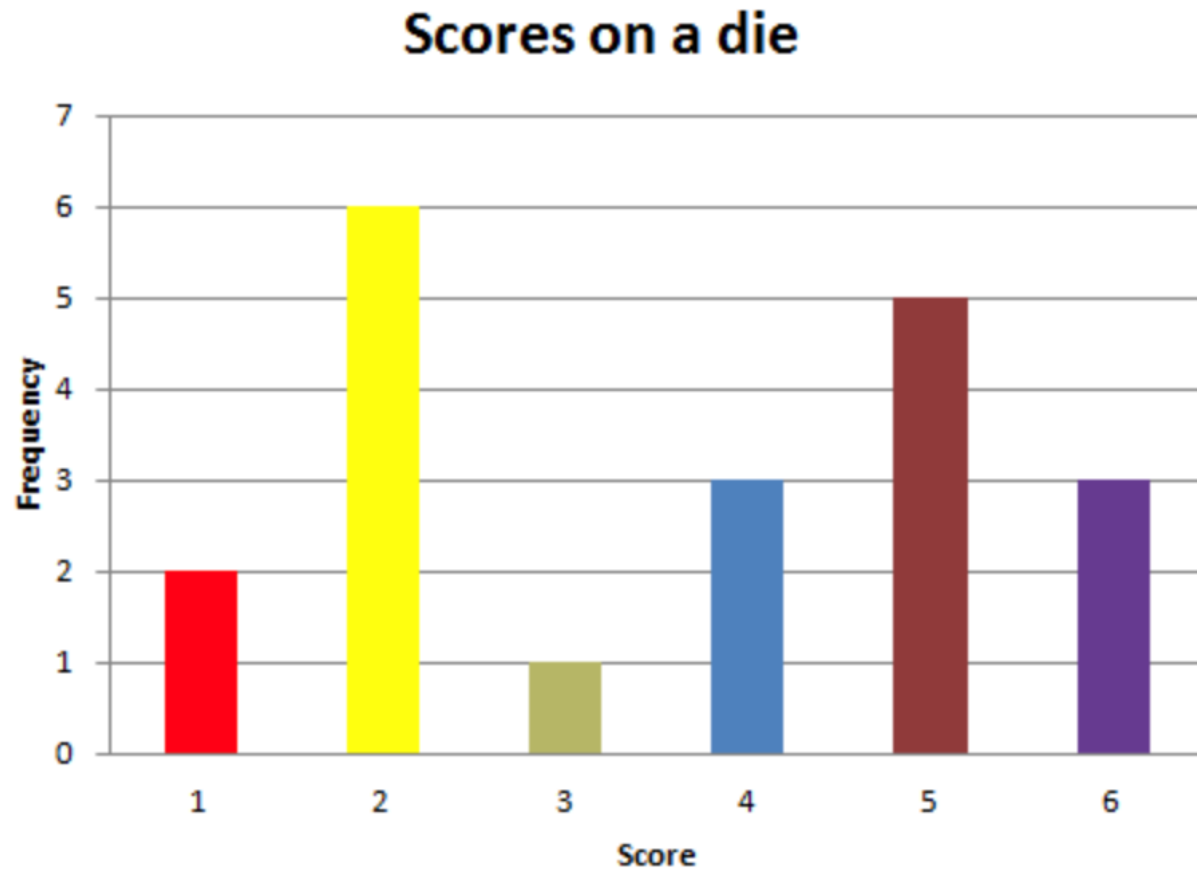
6. Draw the box plot and label points with the numbers.

Space Shuttle Flights : Listed below are the durations (in hours) of a sample of all flights of NASA's Space Transport System (space shuttle): (n=15)

| | | | | | | | |
|-----|-----|-----|-----|-----|-----|-----|-----|
| 0 | 73 | 95 | 165 | 191 | 192 | 221 | 235 |
| 235 | 244 | 259 | 262 | 331 | 376 | 381 | |



7. The bar graph shows the scores obtained from 20 throws of a die.



(a) What is the first quartile (Q_1)?

(b) What is the mean ?

(c) What is the mode ?

8. (**Use the empirical rule**) Suppose SAT scores roughly follows a normal distribution in the U.S. population of college-bound students (with range restricted to 200-800), and the average math SAT is 500 with a standard deviation of 50, then:
- (a) 68% of students will have scores between _____ and _____
 - (b) _____% of students will have scores between 400 and 600
 - (c) 99.7% of students will have scores between _____ and _____
9. Assume the resting pulse rates for a sample of individuals are normally distributed with a mean of 70 and a standard deviation of 15. **Use the empirical rule** to find the following quantities.
- (a) Percentage of pulse rates less than 70
 - (b) Percentage of pulse rates greater than 55
 - (c) Percentage of pulse rates between 55 and 70
 - (d) Percentage of pulse rates between 55 and 100
 - (e) Percentage pulse of rates between 70 and 100
10. Consider an exam taken by 1,000 students for which the scores are normally distributed with a mean of 75 and a standard deviation of 7. (**Use the empirical rule**)
- (a) How many students scored above 89?
 - (b) How many students scored below 68?

11. 95% of students at school weigh between 62 kg and 90 kg. Assuming this data is normally distributed, what are the mean and standard deviation? (**Use the empirical rule**)

(a) μ : _____

(b) σ : _____

12. Enter the river lengths from the table below in your calculator and generate one-variable summary statistics.

| River | Length (miles) |
|-------------|----------------|
| Missouri | 2341 |
| Mississippi | 2202 |
| Yukon | 1979 |
| Rio Grande | 1759 |
| Colorado | 1450 |
| Arkansas | 1443 |
| Columbia | 1243 |
| Red | 1125 |
| Snake | 1040 |
| Ohio | 979 |

(a) Write down the five-number summary of the river lengths :

(b) Find the IQR :

(c) Sample Standard Deviation :

(d) Mean length :

(e) Calculate the fences and identify the outliers (if any). If there are no outliers, state NO OUTLIERS. Show all your work.

13. Find the Standard deviation (Show all your work)

| x_i | $x_i - \bar{x}$ | $(x_i - \bar{x})^2$ |
|-------|-----------------|---------------------|
| 1 | | |
| 1 | | |
| 3 | | |
| 4 | | |
| 4 | | |
| 5 | | |

(a) $\sum_{i=1}^n (x_i - \bar{x})^2 :$

(b) Sample standard deviation (s) :

14. X follows normal distribution $N(\mu = 89, \sigma = 5)$. Find the value x , and the probability.

(a) $P(X \leq 85)$

(b) $P(X \geq 81)$

(c) $P(X = 88)$

(d) P_{20}

(e) $P(X \geq x) = 0.6$

(f) $P(X \leq x) = 0.4$

(g) $P(x \leq X \leq 91.622) = 0.5$

(h) $P(86 \leq X \leq x) = 0.5$

(i) $P(x - 10 \leq X \leq x + 10) = 0.95$ (Use the empirical rule)

(j) $P(x - 15 \leq X \leq x + 5) = 0.95$ (Use the empirical rule)

15. (**Navy pilots**) Men's heights are normally distributed with mean 69.5 in. and standard deviation 2.4 in. Women's heights are normally distributed with mean 63.8 in. and standard deviation 2.6 in. The U.S. Navy requires that fighter pilots have heights between 62 in. and 78 in.
- (a) Find the percentage of women meeting the height requirement. Are many women not qualified because they are too short or too tall?
 - (b) Find the percentage of men meeting the height requirement. Are many men not qualified because they are too short or too tall?
 - (c) If the Navy changes the height requirements so that all women are eligible except the shortest 2% and the tallest 2%, what are the new height requirements for women?
 - (d) If the Navy changes the height requirements so that all men are eligible except the shortest 1% and the tallest 1%, what are the new height requirements for men?

16. Find the indicated IQ score, and round to the nearest whole number. IQ scores are normally distributed with a mean of 100 and a standard deviation of 15
- (a) Find P_{90} , which is the IQ score separating the bottom 90% from the top 10%
 - (b) Find the first quartile Q_1 , which is the IQ score separating the bottom 25% from the top 75%
 - (c) Find the median
 - (d) Find the third quartile Q_3 , which is the IQ score separating the top 25% from the others
 - (e) **(Mensa International)** Mensa International calls itself “the international high IQ society,” and it has more than 100,000 members. Mensa states that “candidates for membership of Mensa must achieve a score at or above the 98th percentile on a standard test of intelligence (a score that is greater than that achieved by 98 percent of the general population taking the test).” **Find the 98th percentile for the population of IQ scores. This is the lowest score meeting the requirement for Mensa membership**

17. In a certain New Mexico county, forest and range fires burn a mean of 4,300 acres per year with standard deviation 750 acres. The distribution of the number of acres burned per year follows Normal distribution.

(a) What percent of the time can we expect more than 5,000 acres to burn per year?

(b) The model predicts that exactly 6275 acres per year will burn _____ percent of the time

(c) What is the third quartile of the number of acres burned per year expected to be?