

Math 111

Chapter 12 Practice Test

1. If I wanted to survey 50 Cabrini College students about where they prefer to eat on campus, which would be the most appropriate way to conduct my survey?
 - a. Find 50 people in the cafeteria and ask them.
 - b. Find 25 people in the cafeteria and 25 people in Jazzman's.
 - c. Randomly survey different classes.

2. A sample is a subset of the population.
3. Construct a frequency distribution for the data of the grades of 25 students taking Math 11 last semester: A, C, D, B, A, A, C, F, B, C, A, D, B, B, D, C, B, C, B, D, A, F, B, C, B

A	5
B	8
C	6
D	4
F	2

4. The average age of the Cabrini College student has changed over the years. The ages of 25 randomly selected students are as follows: 17, 19, 20, 37, 21, 18, 44, 22, 18, 25, 29, 48, 24, 19, 30, 27, 18, 36, 20, 46, 52, 21, 22, 36, 18.

Construct a grouped frequency distribution for the data. Use the classes: under 20, 21- 30, 31 – 40, 41- 50, over 50.

Under 20		9
21-30		9
31-40		3
41-50		3
Over 50		1

5. Make a histogram for the above data:

6. Create a stem and leaf plot for the above data:

1	7, 8, 8, 8, 8, 9, 9
2	0, 0, 1, 1, 2, 2, 4, 5, 7, 9
3	0, 6, 6, 7
4	4, 6, 8
5	2

Match the description to the measure of central tendency.

- 7. Mean C
- 8. Median D
- 9. Mode B
- 10. Midrange A

- a. found by adding the lowest and highest data values and dividing by 2.
- b. the data value that occurs most often in a data set.
- c. obtained by adding all the data items then dividing the sum by the number of items.
- d. the middle-most data value in an ordered list; if there are two values, you would take the mea

11. A lot of Cabrini College students go home on the weekends. For some, this is a longer trip than for others. We asked 10 randomly selected students how many miles it is to home.

21, 6, 13, 36, 22, 48, 104, 73, 158, 17

Find the mean distance of this sample:

$$(21+6+13+36+22+48+104+73+158+17)/10 = 49.8 \text{ Miles}$$

12. Find the median distance of the sample:

6, 13, 17, 21, 22, 26, 48, 73, 104, 158

$$\text{Median} = (22+26)/2 = 24 \text{ Miles}$$

13. For the frequency distribution, give the median:

test scores	100	90s	80s	70s	60s	>50
Number of students (with that grade)	3	5	7	10	3	1

Total number of students: $n = 29$

$(29+1)/2 = 15^{\text{th}}$ position, so in the 80s: $3+5 = 8$; keep going. $8+7 = 15$; our median score is in the 80's

14. Find the mode of the same data:

70's; there were 10 grades in the 70's. This is more than any other range.

15. The **range** is the difference between the highest and lowest data values in a set; indicates the total spread of the data.

16. 94, 62, 88, 85, 95, 90, 85, 100, 85, 91 Find the mean and deviations for the data (only deviations. Not standard deviation yet):

$$(94+62+88+85+95+90+85+100+85+91)/10 = 87.5 \text{ is the mean}$$

Deviations:

$$6.5, -25.5, 0.5, -2.5, 7.5, 2.5, -2.5, 12.5, -2.5, 3.5$$

17. **0** is always the sum of the deviations for a set of data.

18. Compute the standard deviation for the above data:

Data Item	Deviation	Dev ²
100	12.5	156.25
95	7.5	56.25
94	6.5	42.25
91	3.5	12.25
90	2.5	6.25
88	0.5	.25
85	-2.5	6.25
85	-2.5	6.25
85	-2.5	6.25
62	-25.5	650.25

$$\text{Sum of Dev}^2 = 942.5$$

$$\text{Standard deviation} = \sqrt{\frac{\text{Sum of Dev}^2}{n-1}}$$

$$= \sqrt{\frac{942.5}{9}}$$

$$= \sqrt{104.72}$$

$$= 10.23$$

19. Say two sections (A and B) of Math 111 take the same test. Their means are the same, but section A's standard deviation is 4 times the size of B's standard deviation. What do you think this means? (i.e. Which class has more students on the same level?)

Section B has a smaller standard deviation, so the students got scores closer together.

That means they mostly know the same things, or they're on the same level of learning, etc.

20. A bell curve, or a **normal distribution**, is **symmetric**.

21. If the mean SAT score for a group of high school seniors is 800 and a standard deviation of 150, find the score that is

a. 2 standard deviations **below** the mean:

$$150 * 2 = 300. 800 - 300 = 500$$

b. 3 standard deviations **above** the mean:

$$150 * 3 = 450. 800 + 450 = 1250$$

c. The RANGE of scores between 3 standard deviations **below** and 1 standard deviation **above**:

$$150 * 3 = 450. 800 - 450 = 350 \text{ AND } 150 * 1 = 150. 800 + 150 = 950$$

$$950 - 350 = 600$$

22. A **z-score** describes how many standard deviations a data item in a normal distribution lies above or below the mean.

23. When a data value is above the mean, it has a positive z-score.

24. Joe takes a test in Biology and Math. Each test has data values that are normally distributed. He scores an 85% on his Biology test and an 80% on his Math test. The mean grade for the Biology test is 88% with a standard deviation of 3. The mean grade for the Math test is 78% with a standard deviation of 2. Which test did Joe do better in with respect to the rest of the class?

$$\text{For Biology: } z \text{ score} = \frac{85-88}{3} = \frac{-3}{3} = -1$$

$$\text{For Math: } z \text{ score} = \frac{80-78}{2} = \frac{2}{2} = 1$$

Joe did better on his Math test than on his Biology test, since he did better than average in Math, but not Biology.

25. If I did better than 60% of the students taking the SAT, what was my percentile?

60th percentile

26. If I did worse than 27% of the students taking the SAT, what was my percentile?

73rd percentile

27. The 25th percentile is the first quartile, the 50th percentile is the second, and the 75th percentile is the third.

28. In a survey of Cabrini College students, it was found that the average number of nights spent partying in the school year was 40. The data was normally distributed and had a standard deviation of 5. Using the table, find the percentile of students who party less than 50 nights in a school year.

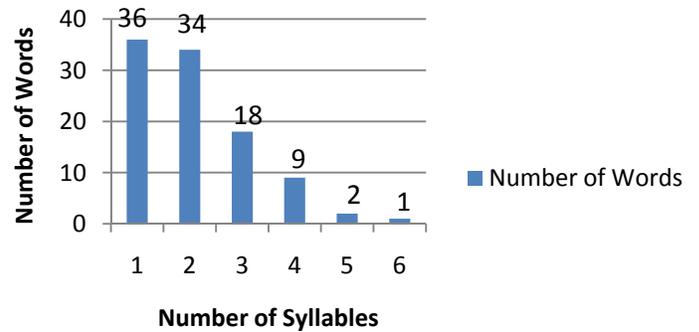
$$z \text{ score for 50 nights of partying: } \frac{50-40}{5} = \frac{10}{5} = 2$$

97.72 percentile.

29. I took a survey of a random sample of 25 people. What is my margin of error?

$$\text{The margin of error is } \pm \frac{1}{\sqrt{25}} = \pm \frac{1}{5}$$

Number of Syllables in Japanese Words



30. Given the histogram, answer the following questions:

- Is the histogram normal, skewed to the right, or skewed to the left?
Skewed Right
- Find the mean, median, and mode for the number of syllables in the sample of Japanese words.

$$\text{Mean: } 2.1 = \frac{1*(36) + 2*(34) + 3*(18) + 4*(9) + 5*(2) + 6*(1)}{100}$$

Median: 2

Mode: 1 (has the highest frequency)

- Are the measures of central tendency from part (b) consistent with the shape of the distribution that you described in part (a)? Explain.

Yes. The mean is greater than the median, so the histogram would be skewed to the right.