

# Statistics and Probability Practice Test

Name KEY Period \_\_\_\_\_

For problems 1 – 5, refer to Carolina High School, which consists of 455 freshmen, 524 sophomores, 518 juniors, and 503 seniors. For the following problems, find each theoretical probability.

1. P(junior or senior)

$$\frac{518}{2000} + \frac{503}{2000} = \frac{1021}{2000} = .5105$$

1. 51.1%

2. P(not freshman)

$$\frac{2000 - 455}{1545} = \frac{1545}{2000} = .7725$$

2. 77.3%

3. P(sophomore)

$$\frac{524}{2000} = .262$$

3. 26.2%

2 EVENTS!

4. P(freshman, then sophomore)  
without replacement

$$\frac{455}{2000} \cdot \frac{524}{1999} = \frac{238420}{3998000} = .05963$$

4. 5.96%

5. P(junior, then senior)  
with replacement

$$\frac{518}{2000} \cdot \frac{503}{2000} = \frac{260554}{4000000} = .0651$$

5. 6.5%

change to one

For problems 6 – 7, you roll **one** dice at a casino. Find each theoretical probability of a combined roll.

6. P(odd number **or** multiple of 4)



$$\frac{3}{6} + \frac{1}{6} = \frac{4}{6} = .\bar{6}$$

6. 66.7 %

7. P(even number, 2, or 7)



$$\frac{3}{6} = .5$$

$$\frac{3}{6} + \frac{1}{6} - \frac{1}{6} = \frac{3}{6}$$

7. 50 %

8. A crate has 9 bottles of pop. **Three** are Pepsi, **two** are Coca-Cola, and **four** are Mountain Dew. What is the probability of picking two Pepsi bottles from the crate, assuming you do not return the first bottle?

$$\frac{3}{9} \cdot \frac{2}{8} = \frac{6}{72} = .0833$$

8. 8.3 %

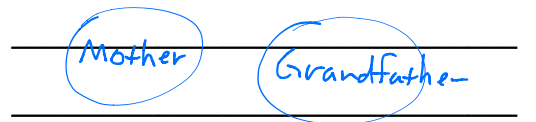
9. Which of the following pairs are **mutually exclusive**? Select A or B. Explain.

Separate

A. Being a mother and a grandfather

B. Being a teacher and a parent

9. A. Cannot be both.



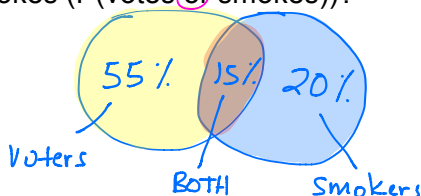
10. Which of the following pairs are **independent events**? Select A or B. Explain.

A. Picking two separate marbles out of a bag

B. Picking a marble out of a bag, **replacing it**, and then picking another marble out of the bag

10. B. The second draw does not depend on the first draw. The denominator stays the same.

11. 55% of the American population votes, 20% of the American population smokes, and 15% of the American population votes and smokes. What percentage of the American population votes or smokes (P(votes **or** smokes))?



$$55\% + 20\% - 15\%$$

60%

11. 60 %

For problems 12 – 13, determine how many passwords are possible. **Show work or receive no credit.**

12. Three letters and five digits (0 – 9). Letters and digits can be repeated.

$$\begin{array}{ccccccccc} \underline{A} & \underline{B} & \underline{C} & \underline{1} & \underline{2} & \underline{3} & \underline{4} & \underline{5} \\ 26 \cdot 26 \cdot 26 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \cdot 10 \end{array}$$

12. 1,757,600,000 different passwords

13. Four letters and six digits (0 – 9). The first letter must be M, and the second letter must be G. Letters and digits cannot be repeated.

$$\begin{array}{ccccccccccc} \boxed{M} & \boxed{G} & \boxed{\phantom{0}} & \boxed{\phantom{0}} & \boxed{\phantom{0}} & \boxed{\phantom{0}} & \boxed{\phantom{0}} & \boxed{\phantom{0}} & \boxed{\phantom{0}} & \boxed{\phantom{0}} \\ 1 \cdot 1 \cdot 24 \cdot 23 \cdot 10 \cdot 9 \cdot 8 \cdot 7 \cdot 6 \cdot 5 \end{array}$$

13. 83,462,400 different passwords

For questions 14 – 15, **show work or receive no credit.**

14. Mr. Schumann wants to choose groups of 2, 4, or 5 students out of a class of 20 students. How many groups of students can he pick? *Order doesn't matter.*

$$20C_2 + 20C_4 + 20C_5$$

$$190 + 4845 + 15504 = \boxed{20,539}$$

14. 20,539

15. Mr. Geist is a compulsive gambler that bets on horses. He goes to a horse race where 8 horses are racing. How many different ways can the 8 horses win 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> place? *Order matters*

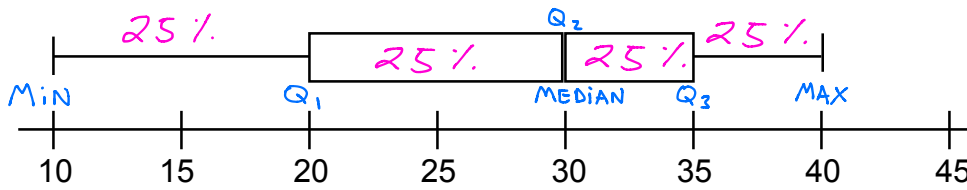
$$\frac{8 \cdot 7 \cdot 6}{1^{st} \quad 2^{nd} \quad 3^{rd}} = \boxed{336}$$

OR

$$8P_3 = 336$$

15. 336

For questions 16 – 20, refer to the following box-and-whisker plot.



16. Find the interquartile range of the data.

$$Q_3 - Q_1$$

$$35 - 20 = \textcircled{15}$$

16. 15

17. What does the interquartile range tell you about the data?

17. 50% of the data is between 35 and 20.

18. Find the range of the data.

$$MAX - MIN$$

$$40 - 10$$

18. 30

19. Find the median of the data.

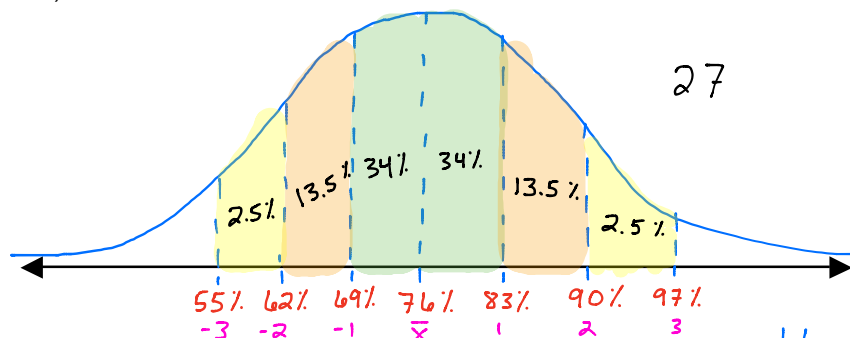
19. 30

20. What percent of data is between 20 and 30?

20. 25%

21. A classroom set of grades has a mean of 76% and a standard deviation of 7%.

A. Draw the normal curve for this distribution. Label the x-axis with the values that are one, two, and three standard deviations from the mean.

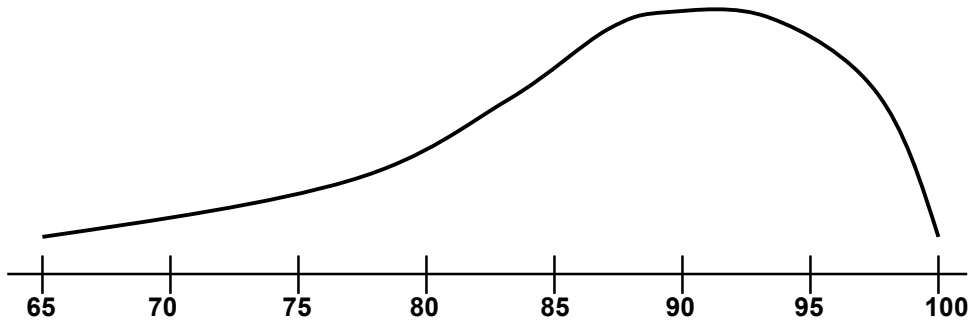


B. What percentage of the data has the value of 83% or above?

$$13.5\% + 2.5\%$$

B. 16%

22. Below is a distribution of test scores from Mr. Geist's differentiated chemistry class. Are the scores positively skewed, negatively skewed, or normally distributed? Explain. Also explain how the mean is affected by this distribution.



Explanation: Negatively Skewed. Low test scores stretch the curve left. The mean is lower than it would have been in a normal distribution.

23. The salaries of teachers at a small rural school are shown below.

A. What is the mean, median, and mode of the salaries?

Salaries of teachers at the school:

\$28,000	\$34,000	\$36,000
\$28,000	\$34,000	\$38,000
\$28,000	\$34,000	\$70,000
\$34,000		

A. Mean: \$ 36,400  
 Median: \$ 34,000  
 Standard deviation: \$ 11,689.31

B. The local school board and teacher's union are preparing to meet about pay raises. If you were a teacher making the lowest salary, which of the following would you **NOT** use to justify a pay raise: the mean or the median? Why?

Explanation: I would not mention the Median because it is lower. I would mention the mean (average) salary is \$36,400 because the \$70,000 outlier skews the mean positively.

C. How would it impact the mean and the standard deviation if you removed the \$70,000 salary? Explain.

Mean: The mean would drop to \$32,666 because the \$70,000 salary is an outlier. The distribution would be more "normal".

Standard deviation: The S.D. would also drop to \$3527 because of the same reason.