

Name _____

Acc PreCal

Date _____ Period _____

PROB/STAT TEST REVIEW

YOU MUST SHOW WORK TO RECEIVE FULL CREDIT!!!

Use the following to answer questions #1-3

A new tutoring company claims that their services will increase scores on the US History Milestone. In a random sample of 1600 students using the service, 28% saw an increase in scores.

1. If the scores of those sampled is normally distributed, what was the mean and standard deviation of students who saw an increase?

Mean: $\bar{x} = 1600(.28) = 448$ Standard Deviation: $\sigma = \sqrt{448(.72)} \approx 18$

2. What is the probability that at most 450 students were helped by this tutoring company?

$$z = \frac{450 - 448}{18} = 0.1 \quad .5398$$

3. What is the probability that at least 500 students will see an increase using this particular tutoring service?

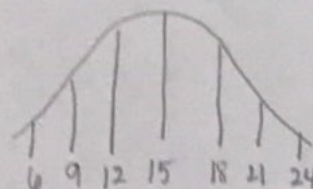
$$z = \frac{500 - 448}{18} = 2.9 \quad .0019$$

Use the following problem to answer questions #4-7

The "Freshman Fifteen" is a legendary myth. According to the legend, the average college freshman will gain on average 15 pounds during their freshman year. If this data is based on a normal distribution with a standard deviation of 3 pounds, determine the following probabilities:

4. The probability that a randomly selected freshman gains more than 18 pounds.

$$.16$$



5. The probability that a randomly selected freshman gains between 10 and 17 pounds.

$$\frac{10-15}{3} = -1.7 \quad .0446 \quad \frac{17-15}{3} = 0.7 \quad .7580 \quad .7134$$

6. The probability that a randomly selected freshman gains less than 7 pounds.

$$\frac{7-15}{3} = -2.7 \quad .0035$$

7. If the myth holds true, how many of the Class of 2019 (322 students) can expect to gain at least 10 pounds their first year of college?

$$.9554(322) \quad 308 \text{ kids}$$

Use the following to answer question

The planning committee for the new Buford school is struggling with predicting the amount of students that will be attending in the first year it is built. If you look at recent 5 year trends, the enrollment is normally distributed with an average enrollment of 1320 and a standard deviation of 100. Determine the following:

8. The probability that the enrollment the first year of the new school building is at least 1400 students.

$$\frac{1400 - 1320}{100} = 0.8$$

.2119

9. The probability that the enrollment during the first year will be between 1100 and 1300 students.

$$\frac{1100 - 1320}{100} = -2.2$$

.0139

$$\frac{1300 - 1320}{100} = -0.2$$

.4207

.4068

10. What enrollment number would be considered to have a probability of .6915 (work backwards from your chart)?

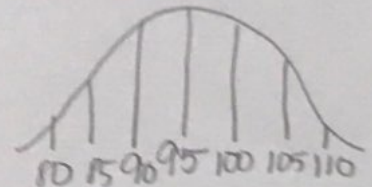
$$0.5 = \frac{x - 1320}{100}$$

1370

11. The speeds of cars on a highway have a mean of 95 km/hour with a standard deviation of 5 km/hour.

- a. What percentage of cars averaged less than 85 km/hour?

2.5%



- b. If a police car stopped cars that were going more than 105 km/hour, how many cars would they

stop if there were 8000 cars on the highway?

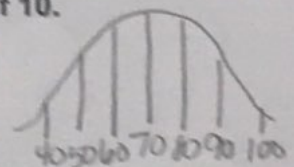
.025 (8000)

200 cars

12. A grading scale is set up for 1000 students' test scores. It is assumed that the scores are normally distributed with a mean score of 70 and a standard deviation of 10.

- a. How many students will have scores between 80 and 90?

.135 (1000) = 135 kids



- b. If 65 is the lowest passing score, how many students are expected to pass the test?

$$\frac{65 - 70}{10} = -0.5$$

.6915 (1000)

692 kids

$$\frac{85-70}{10} = 1.5$$

$$.9332$$

$$\frac{95-70}{10} = 2.5$$

$$.9938$$

$$.0606(1000)$$

61 kids

$$6.06\%$$

c. What percent of students scored between 70 and 95?

Determine the following possibilities using permutations, combinations, or the counting principle:

13. A new ice cream parlor has opened on Main Street. It offers 15 different flavors of ice cream, 6 different flavors of sherbet, and 5 different flavors of frozen yogurt. If you are allowed to put one of each type of offering on a sundae, how many different ways can a customer place an order?

$$15 \cdot 6 \cdot 5$$

$$(450)$$

14. A rival ice cream parlor across town has decided to try to sway customers back to their store. They offer 20 different flavors of ice cream and 3 different flavors of sherbet. This parlor is letting customers choose 3 different flavors of ice cream and 1 flavor of sherbet for their sundae. How many ways can a customer place an order at this parlor?

$$20C_3 \cdot 3C_1$$

$$(3420)$$

15. Which of the following world capitals below has the most distinguishable permutations of their name?

a. BRUSSELS

b. PAGO PAGO

c. VALLETTA

$$\frac{8!}{3!} = 6720$$

$$\frac{8!}{2!2!2!} = 2520$$

$$\frac{8!}{2!2!2!} = 5040$$

16. You are setting the code on a five-digit lock and want to use the numbers 9-4-3-2-5. You only want to use each number one time. How many different ways can you create a code for your lock?

$$5 \cdot 4 \cdot 3 \cdot 2 \cdot 1$$

$$(120)$$

17. A team of 10 dodgeball players must pick 2 players to help re-fill the water cooler for their games. How many different ways can 2 players be selected?

$$10C_2$$

$$(45)$$

18. A new software company is looking to hire an Engineer, an Accountant, a Customer Support Specialist, and a Tech Supervisor. If there are 25 applicants, how many ways can these jobs be assigned?

$$25P_4$$

$$(303,600)$$

19. A soccer coach must choose which of his players will go out to midfield for the opening coin toss. He has 18 total players and can choose 1, 2, or 3 players for the toss. How many ways can he make a decision?

$$18C_1 + 18C_2 + 18C_3 = 18 + 153 + 816$$

$$(987)$$

20. Your last benchmark in PreCal contained 25 total questions with 4 answer choices. If I kept each question the same, how many ways could I arrange the answer choices to create separate versions?

$$4^{25} = 1.13 \times 10^{15}$$

For questions #21-24, two colored dice (green & yellow) are rolled. Determine the following probabilities.

1 2 3 4 5 6

1
2
3
4
5
6



21. You roll a sum of 6

$$\frac{5}{36}$$

22. You roll a product less than 25

$$\frac{32}{36} = \frac{8}{9}$$

23. You roll a 5 or 6 on each dice

$$\frac{4}{36} = \frac{1}{9} \cdot \frac{1}{3}$$

5,5
5,6
6,5
6,6

24. Both dice are multiples of 2

$$\frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$$

For questions #25-28, find the given probabilities when drawing a single card at random using a standard deck of cards.

25. The probability you draw a 5 or a spade

$$\frac{4}{52} + \frac{13}{52} - \frac{1}{52} = \frac{16}{52} = \left(\frac{4}{13}\right)$$

26. The probability you draw a face card or a red card

$$\frac{12}{52} + \frac{26}{52} - \frac{6}{52} = \frac{32}{52} = \left(\frac{8}{13}\right)$$

27. The probability you draw a multiple of 3 or an odd numbered card

$$\frac{12}{52} + \frac{16}{52} - \frac{8}{52} = \frac{20}{52} = \left(\frac{5}{13}\right)$$

3, 6, 9 3, 5, 7, 9

28. The probability you draw the Jack of Hearts or a diamond

$$\frac{1}{52} + \frac{13}{52} = \frac{14}{52} = \left(\frac{7}{26}\right)$$

29. Using a standard deck of cards, how many ways could you order all the clubs in the deck?

13! 6,227,020,800

30. I have all the face cards and every ace from a deck in my hand. How many ways can I choose a group of 6 of these cards to use to build a house of cards?

¹²16 C₆ 8,008