

**Math 312 Exam #1 (Ch 27, 28, 33.1)**

**Name:**

**Instructions:** This exam is due on Canvas by 11:59 pm. You must show all work to receive credit. Write answers clearly in the spaces provided and be clear in all explanations of your answers. No calculators. Answers may be in decimal or equivalent fraction form. Good luck!

*I have read and understood SDSU's academic integrity policies. I pledge on my honor that I have not given or received any unauthorized assistance on this assignment/examination.*

*Signature:* \_\_\_\_\_

1. (2 points) Imagine we are performing the experiment of rolling two fair die at the same time. Describe a possible event of this experiment and a related outcome of your event.

Possible event:.....

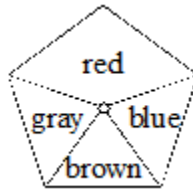
Possible outcome:.....

Answer questions 2 - 5 with either **True** or **False**. If your answer is **False**, you must provide an explanation in order to receive full credit for the question. (2 points each)

2. An event that CANNOT happen has a negative probability.
  
  
  
  
  
  
  
  
  
  
3. If Y is impossible, the probability of not Y is one.
  
  
  
  
  
  
  
  
  
  
4. If a fair die is rolled once, the probability that you get a four, given that the die comes up an even number, is one-sixth.
  
  
  
  
  
  
  
  
  
  
5. If  $A$  and  $B$  are disjoint events, then  $P(A \text{ or } B) = P(A) + P(B)$ .

6. (2 points) A bag has only red balls and green balls. The experiment is to draw one ball from the bag without looking. What does it mean to say, “The probability of getting a green ball is 40%”?

7. A) (1 pt) The *theoretical probability* of getting red for the spinner below is \_\_\_\_\_. (The spinner is a regular pentagon.)



- B) (1 pt) What are the odds of spinning on red?

- C) (1 pt) Explain how you would find the experimental probability for getting red for the spinner above if you wished to check your theoretical probability.

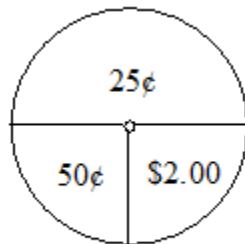
8. (2 pts) Design a simulation for a spinner that would allow a simulation of a birth happening during any of the 12 months of the year with equal probabilities. Describe how you would carry out the simulation.

9. (1 pt each) A fair die is rolled once. Find the probability of rolling:
- a. The number 2
  - b. A number other than 2
  - c. An even number
  - d. A number less than 5
  - e. A number greater than 6
10. I have a spinner with three regions, A, B, and C. I know the  $P(A)=\frac{1}{5}$  and  $P(C)=\frac{2}{5}$ . I also have an unfair coin, with  $P(\text{head})=0.6$ . Answer the following questions:
- a. (5 pts) Construct a tree diagram representing one spin and one toss. Include all probabilities and outcomes.

b. (2 pts) What is the probability of spinning region A or tossing a tail?

11. (4 pts) In my bag I have 2 dimes, 2 nickles, and 1 penny. I get to the candy shop and randomly pick two coins out of my bag. I am hoping to buy a candy bar that costs 15 cents. What are the chances I will be able to buy it?

12. Spin-and-Win is under new management. The new management has changed the spinner as below and now charges \$1 per spin. (The person spinning wins the amount pointed to by the spinner.)



Cost: \$1 per spin

A) (2 pt) What is the expected value for this game? (Show your work.)

B) (2 pt) What does your answer in part A mean if there are 1000 customers who play the game in a week?

13. Malta City has two major construction projects to consider. (1) build a pedestrian bridge over a busy street or (2) build a new park. The budget will not allow for both projects to be funded, so the city council must decide to vote. In a polling of 500 random citizens, 30% were parents of school children. Of these parents, 60% favored the park; 50% of the nonparents favored the bridge. Assume that future votes give the same results. Construct a contingency table (5 points) to find the following probabilities. (2 points each)

- (i)  $P(\text{favor bridge} \mid \text{parent})$
- (ii)  $P(\text{parent} \mid \text{favor bridge})$
- (iii)  $P(\text{favor bridge} \text{ or } \text{parent})$
- (iv)  $P(\text{favor park and parent})$

EXTRA CREDIT: (2 points) You give a child the choice of drawing from two bags of balls. The child wins if he/she draws a red ball. Bag 1 has four red balls and seven green balls; bag 2 has two red balls and three green balls. Which bag gives the child a better chance of winning (or are the chances the same)? Please explain.