

Give at least 3 decimal places when rounding your answers.

1. If the probability that an event will occur is  $\frac{5}{13}$ , what are the odds in favor of this event?
2. There are 12 students in a class, 7 girls and 5 boys. Three students are randomly chosen to be on a class committee. What is the probability that the committee will have 1 boy and 2 girls on it?
3. On a single roll of a fair die, what is the probability that the number that appears is less than 4?
  - (a)  $\frac{1}{6}$
  - (b)  $\frac{2}{6}$
  - (c)  $\frac{3}{6}$
  - (d)  $\frac{4}{6}$
  - (e)  $\frac{5}{6}$
4. There are 9 balls in a bag, 4 red and 5 blue. You reach in and randomly select 3 balls (without replacement). Find the probability of selecting exactly one blue ball.
5. Three different prize winners will be selected from a group of 4 men and 4 women. If the prizes are all the same, what is the probability that all 3 winners will be women?
6. In a swimming event, 2 of the 7 entrants are Australian. If the entrants are randomly assigned to lanes 1 through 7, what is the probability that the two Australians are assigned to the first two lanes?
  - (a)  $\frac{1}{21}$
  - (b)  $\frac{2}{21}$
  - (c)  $\frac{3}{21}$
  - (d)  $\frac{4}{21}$
  - (e) None of these
7. Four marbles are chosen from an urn that contains 11 marbles, 7 yellow and 4 black. Find the probability that at least one marble is black.

8. A quiz consists of 5 multiple choice questions. Each question has 3 choices. A student randomly guesses on all 5 questions. Find the probability that the student gets exactly 2 questions correct.

9. There are 6 Republicans and 4 Democrats. We choose a committee of 2. Find the probability that both committee members will be Republican, given that at least one is Republican.

10. A pair of dice is rolled and the sum is noted. Find the probability that the sum is 10 given that at least one die showed a 4.

- (a)  $3/36 = 1/12$
- (b)  $2/36 = 1/18$
- (c)  $2/11$
- (d)  $2/3$
- (e) None of these

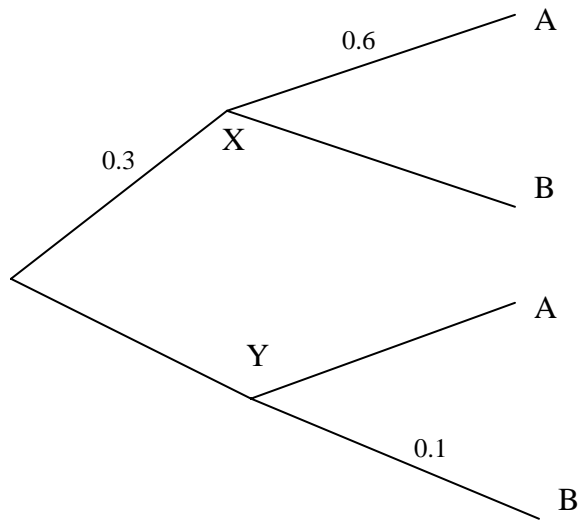
11. A sales person plans to visit Annapolis, Bloomington, Carmel, Detroit and Elksville on a business trip. Since Annapolis is not in the Midwest, he wants to visit that city last. If his boss randomly selects the order of the 5 cities to be visited, what is the probability that Annapolis will be last?

- (a) 0.00833
- (b) 0.2
- (c) 0.25
- (d) 0.4
- (e) None of these

12. You flip a coin that is not fair; the probability of heads on each flip is 0.7. If the coin shows heads, you draw a marble from Urn H with 1 blue and 4 red marbles. If the coin shows tails, you draw a marble from Urn T with 3 blue and 1 red marble. Find the following probabilities:

- (a) The probability of choosing a red marble.
- (b) The probability of choosing a blue marble, given that the coin showed heads.
- (c) The probability that the coin showed tails, given that the marble was red.

13. Given the tree diagram below, answer the following probability questions.



(a) Find  $\Pr [B | X]$

(b) Find  $\Pr [A]$

(c) Find  $\Pr [Y | B]$

14. Bart and Lisa and 5 other kids are to randomly line up in a row for a picture. Find the probability that Bart and Lisa will be standing next to each other.

15. Let C and D be events with  $\Pr[C]=0.4$  and  $\Pr[D]=0.5$  and  $\Pr[C \cup D]=0.6$ . Find  $\Pr[C|D]$ .

(a)  $3/10$

(b)  $5/6$

(c)  $4/6$

(d)  $6/5$

(e)  $3/5$

(f) None of these

16. If  $\Pr [A] =0.4$  and  $\Pr [B] =0.5$

(a) If A and B are disjoint, find  $\Pr [A \cup B]$

(b) If A and B are independent, find  $\Pr [A \cup B]$

17. If the odds in favor of an event are 7 to 5, what is the probability that the event will **not** occur?

- (a)  $5/10$
- (b)  $7/10$
- (c)  $5/12$
- (d)  $7/12$
- (e) None of these

18. Of Americans, 26% are under 18. What are the odds that a person selected at random is under 18?

- (a) 26 to 100
- (b) 74 to 100
- (c) 26 to 74
- (d) 74 to 26
- (e) None of these

19. An unfair coin with  $\Pr [H] = 0.4$  is flipped. If “heads”, a student is randomly selected from a class of 2 boys and 8 girls. If “tails”, a student is selected from a different class of 3 boys and 7 girls.

- (a) Find the probability that a boy is selected, given that the coin showed “tails.”
- (b) Find the probability that the coin showed “tails” given that a girl was selected.

20. A test for diabetes results in a positive test in 95% of the cases where the disease is present and a negative test in 97% of the cases where the disease is absent. If 10% of the population has diabetes, what is the probability that a randomly selected person has diabetes, given that his test is positive?

21. An unfair coin with  $\Pr [\text{heads}] = 0.7$  is flipped five times.

- (a) What is the probability of getting exactly three heads in the five flips?
- (b) What is the probability of getting four or more heads in five flips?
- (c) What is the probability of getting at least one tail?

22. In a local high school, 65% of the students are female. Female students are twice as likely to enroll in the school's choral program as male students. 30% of the female students are enrolled in the school's choral program. If a randomly selected student is enrolled in the choral program, what is the probability that this student is female?

23. Five cards are drawn from a deck of 52. What is the probability that all five cards are from the same suit?

(a)  $1/4$

(b)  $\frac{C(4,1)C(13,5)}{C(52,5)}$

(c)  $\frac{P(13,5)}{P(52,5)}$

(d)  $\frac{C(13,5)}{C(52,5)}$

(e) None of these

24. A committee of 5 will be chosen from a group of 4 men and 6 women. What is the probability that at least 3 men are chosen?

(a)  $\frac{C(4,3)C(6,2)}{C(10,5)}$

(b)  $\frac{C(4,3) + C(4,4)}{C(10,5)}$

(c)  $\frac{C(4,3)C(7,2)}{C(10,5)}$

(d)  $\frac{C(4,3)C(6,2) + C(4,4)C(6,1)}{C(10,5)}$

(e) None of these