

Principles of
Mathematics 12



Practice Exam

Probability

--QUESTIONS--

Principles of Math 12: Probability Practice Exam

Use this sheet to record your answers:

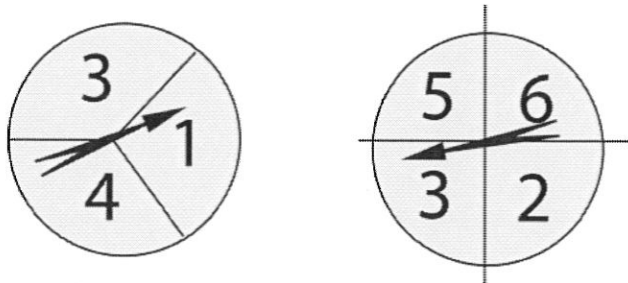
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|-----|-----|-----|-----|
| 1. | 12. | 23. | 34. |
| 2. | 13. | 24. | 35. |
| 3. | 14. | 25. | 36. |
| 4. | 15. | 26. | 37. |
| 5. | 16. | 27. | 38. |
| 6. | 17. | 28. | 39. |
| 7. | 18. | 29. | |
| 8. | 19. | 30. | |
| 9. | 20. | 31. | |
| 10. | 21. | 32. | |
| 11. | 22. | 33. | |

PART A - MULTIPLE CHOICE (non - calculator)
SECTION I – There are 10 questions in this part of the practice exam

1. Two fair six-sided die are rolled and the face values are added. The probability of obtaining an odd number greater than 8 is

- A. $\frac{1}{6}$
- B. $\frac{2}{9}$
- C. $\frac{1}{9}$
- D. $\frac{1}{4}$

2. In a game, each spinner is spun once and the results are added.



The probability that the sum is an even number is

- A. $\frac{1}{2}$
- B. $\frac{1}{3}$
- C. $\frac{2}{5}$
- D. $\frac{3}{7}$

3. A jar contains 3 chocolate chip cookies and x oatmeal cookies. Two cookies are pulled from the jar without replacement. An expression that represents the probability one cookie is chocolate chip and the next cookie is oatmeal is

A. $\left(\frac{3}{x+3}\right)\left(\frac{x-1}{x+2}\right)$

B. $\left(\frac{3}{x+3}\right)\left(\frac{x}{x+2}\right)$

C. $\left(\frac{3}{x+3}\right)\left(\frac{x-1}{x+2}\right)$

D. $\left(\frac{3}{x+3}\right)\left(\frac{2}{x+2}\right)$

4. Three cards are pulled from a deck of 52 cards. The probability of obtaining *at least one club* is

A. $\frac{{}_{39}P_3}{{}_{52}P_3}$

B. $1 - \frac{{}_{39}P_3}{{}_{52}P_3}$

C. $\frac{{}_{39}C_3}{{}_{52}C_3}$

D. $1 - \frac{{}_{39}C_3}{{}_{52}C_3}$

5. If a fair six-sided die is tossed twice, the probability that the first toss will be a number less than 4 and the second toss will be a number greater than 4 is

A. $\frac{1}{3}$

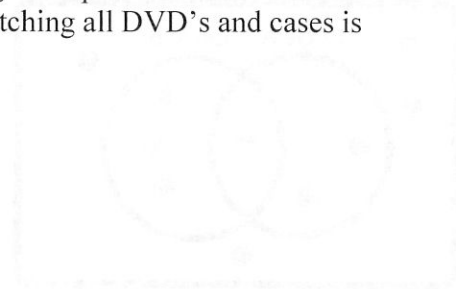
B. $\frac{5}{6}$

C. $\frac{1}{6}$

D. $\frac{3}{4}$

6. Three different DVD's and their corresponding DVD cases are randomly strewn about on a shelf. If a young child puts the DVD's in the cases at random, the probability of correctly matching all DVD's and cases is

- A. $\frac{1}{3!}$
B. $\frac{2}{3!}$
C. $\frac{3}{3!}$
D. $\frac{1}{6!}$



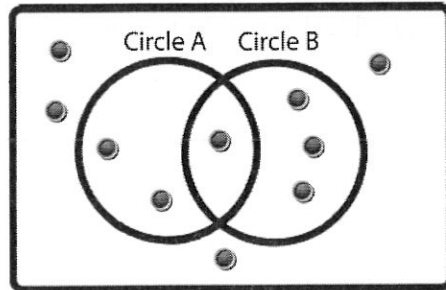
7. In a playoff series, the probability that Team A wins over Team B is $\frac{3}{5}$, and the probability that Team C wins over Team D is $\frac{4}{7}$. If the probabilities are independent, the probability that Team A wins and Team C loses is

- A. $\frac{9}{35}$
B. $\frac{12}{35}$
C. $\frac{7}{12}$
D. $\frac{1}{3}$

8. A 5 digit PIN number can begin with any digit (except zero) and the remaining digits have no restriction. If repeated digits are allowed, the probability of the PIN code beginning with a 7 and ending with an 8 is

- A. $\frac{1}{10}$
B. $\frac{2}{5}$
C. $\frac{1}{100}$
D. $\frac{1}{90}$

9. The diagram below shows the results of a game where discs are thrown into two circles.



The value of $P(\bar{A})$ is

- A. 0.3
 - B. 0.4
 - C. 0.7
 - D. 0.8
10. The value of $P(B|A)$ is

- A. $\frac{1}{3}$
- B. $\frac{2}{7}$
- C. $\frac{1}{4}$
- D. $\frac{4}{9}$

PART A: MULTIPLE CHOICE (calculator permitted)
SECTION II – There are 29 questions in this part of the practice exam

11. Two cards are drawn *without replacement* from a deck of 52 cards. The probability of the first card being a red face card and the second card being a club is
- A. $\frac{1}{34}$
 - B. $\frac{3}{104}$
 - C. $\frac{19}{52}$
 - D. $\frac{9}{22}$

Use the following information to answer questions 12 and 13

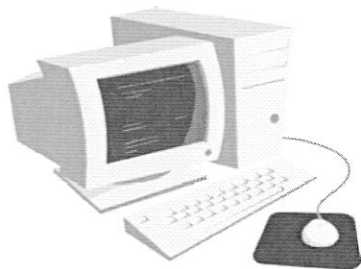
In a small town with two schools, 1000 students were asked if they had a cell phone.
The results of the survey are shown below:

| | Students who have a cell phone | Students who do not have a cell phone | Total |
|-----------------|-----------------------------------|--|-------|
| School A | 365 | 156 | 521 |
| School B | 408 | 71 | 479 |
| Total | 773 | 227 | 1000 |

12. The probability that a randomly selected student has a cell phone and is from School B is, to the nearest hundredth
- A. 0.21
 - B. 0.41
 - C. 0.62
 - D. 0.85
13. The probability that a randomly selected student has a cell phone *given that* the student attends School B is
- A. 0.21
 - B. 0.41
 - C. 0.62
 - D. 0.85

Use the following information to answer questions 14 and 15

In a particular city, 82% of the residents have a desktop computer, 47% have a desktop computer and a laptop computer, and 3% have neither a desktop nor a laptop computer.



14. The probability that a randomly selected home has a laptop computer is
- A. 35%
 - B. 62%
 - C. 79%
 - D. 97%
15. Given that a randomly selected home has a desktop computer, the probability this home does not have a laptop computer is
- A. 0.28
 - B. 0.43
 - C. 0.51
 - D. 0.55

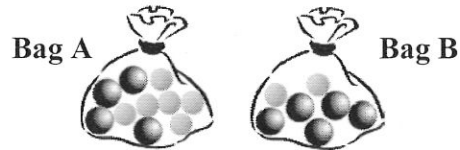
16. There are 12 runners in a marathon. A person may bet on the race by correctly selecting the top three runners *and* the order they finish in. All runners have an equal chance of winning. The probability that a single bet will win is

- A. $\frac{1}{1320}$
- B. $\frac{3}{1320}$
- C. $\frac{1}{220}$
- D. $\frac{3}{220}$

Use the following information to answer questions 17, 18, and 19

Bag A contains four metal balls (*darker*) and six glass balls (*lighter*).

Bag B contains five metal balls and two glass balls.



In a game, a person rolls a die to determine which bag to pull a ball out of.

If the die rolls a 1 or 2, the ball is pulled from Bag A.

If the die comes up 3, 4, 5, or 6, the ball is pulled from Bag B.

17. The probability of selecting a metal ball is
- A. $\frac{1}{4}$
 - B. $\frac{82}{91}$
 - C. $\frac{64}{105}$
 - D. $\frac{2}{3}$
18. If a metal ball is selected, the probability it was pulled from Bag B is
- A. 0.25
 - B. 0.31
 - C. 0.62
 - D. 0.78
19. If two balls are pulled out of Bag B without replacement, the probability they are both made of the same material is
- A. $\frac{11}{21}$
 - B. $\frac{32}{51}$
 - C. $\frac{2}{5}$
 - D. $\frac{3}{5}$

20. A survey determines that in a particular town, 33% of the residents jog, 42% bike, and 12% do both activities. The probability that a randomly selected person does neither activity is
- A. 0.29
 - B. 0.37
 - C. 0.61
 - D. 0.75
21. Five cards are dealt from a deck of 52 cards. The probability of obtaining 2 black cards and 3 red *face* cards is
- A. $\frac{5}{52}$
 - B. $\frac{195}{779688}$
 - C. $\frac{25}{9996}$
 - D. $\frac{3}{5}$
22. In a junior football league, 55% of the players come from Western Canada, and 45% are from Eastern Canada. From this league, 17% of the Western players and 11% of the Eastern players will go on to the CFL. If a randomly chosen CFL player who came from the junior league is selected, the probability he came from Eastern Canada is
- A. $\frac{99}{2000}$
 - B. $\frac{5}{6}$
 - C. $\frac{4}{19}$
 - D. $\frac{9}{26}$

Use the following information to answer questions 23 and 24

A trick coin is designed so the probability it will land “heads” is $\frac{5}{8}$.

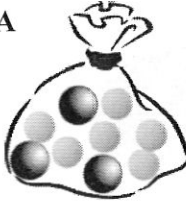


23. If the coin is flipped 3 times, the probability that the first 2 flips are heads and the third flip is tails is
- A. $\frac{1}{8}$
 - B. $\frac{75}{256}$
 - C. $\frac{75}{512}$
 - D. $\frac{3}{8}$
24. If the coin is flipped until exactly two tails appear, the probability it will take exactly three flips to obtain the second tail is
- A. $\frac{1}{8}$
 - B. $\frac{45}{256}$
 - C. $\frac{45}{512}$
 - D. $\frac{3}{8}$

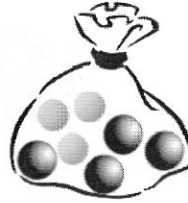
Use the following information to answer questions 25 and 26

Bag A contains three metal balls and six glass balls,
and Bag B contains four metal balls and three glass balls.

Bag A



Bag B



In a game, a person rolls a die to determine which bag to pull a ball out of.
If the die rolls a 1, 2 or 3, the ball is pulled from Bag A.
If the die comes up 4, 5, or 6, the ball is pulled from Bag B.

25. The probability that a glass ball is selected is

- A. $\frac{21}{39}$
- B. $\frac{5}{7}$
- C. $\frac{9}{13}$
- D. $\frac{23}{42}$

26. If the ball selected is made of glass, the probability it came from Bag B is

- A. 0.24
- B. 0.39
- C. 0.58
- D. 0.71

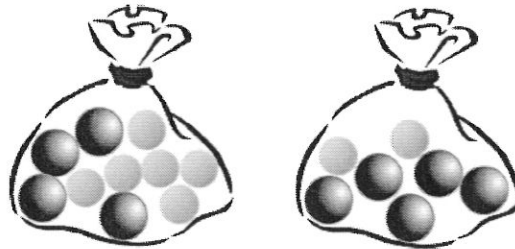
27. Out of 90 people, 32 like corn, 23 like corn and carrots, and 7 like neither corn nor carrots. The probability a randomly selected person will like only carrots is

- A. 0.567
- B. 0.626
- C. 0.688
- D. 0.715

28. The probability of having a particular disease is 5%. The test to determine if a person has this disease is 83% accurate. The probability that a randomly selected person tests positive is
- A. 0.203
 - B. 0.246
 - C. 0.288
 - D. 0.300

Use the following information to answer questions 29 and 30

Bag A contains four metal balls and six glass balls,
and Bag B contains five metal balls and two glass balls.



29. A ball is randomly selected from Bag A and placed in Bag B. A ball is then pulled at random out of Bag B. The probability that the ball from Bag B is metal is
- A. 0.425
 - B. 0.555
 - C. 0.675
 - D. 0.722
30. If a metal ball was selected from Bag B, then the probability that a glass ball was transferred from Bag A to Bag B is
- A. 0.425
 - B. 0.555
 - C. 0.675
 - D. 0.722

31. A five card hand is dealt from a deck of 52 cards. The probability the hand contains 2 diamonds and 3 black cards is
- A. $\frac{1}{9}$
 - B. $\frac{46}{555}$
 - C. $\frac{65}{833}$
 - D. $\frac{2}{7}$
32. If 3% of the population has a specific disease, and the test for this disease is 92% accurate, the probability a person does not have the disease given that the test result is positive is
- A. 0.74
 - B. 0.79
 - C. 0.88
 - D. 0.92
33. If a five card hand is dealt from a deck of 52 cards, the probability the hand contains exactly one heart is
- A. 0.17
 - B. 0.29
 - C. 0.33
 - D. 0.41
34. If a five card hand is dealt from a deck of 52 cards, the probability the hand contains at least one heart is
- A. 0.54
 - B. 0.64
 - C. 0.78
 - D. 0.86

35. A grocery store obtains 35% of its produce from vendor A, and 65% of its produce from vendor B. It is expected that spoilage will result in 12% of vendor A's produce and 17% of vendor B's produce to be discarded. The probability a randomly picked produce item came from vendor A, given that it was picked from the discard pile, is

A. $\frac{22}{91}$

B. $\frac{44}{187}$

C. $\frac{84}{305}$

D. $\frac{33}{101}$

36. Seven people are randomly selected from a group of 10 men and 11 women to form a committee. The probability exactly 5 males are on the committee is

A. 0.02

B. 0.08

C. 0.12

D. 0.16

37. Five balls are drawn without replacement from a bag containing 3 metal balls and 5 glass balls. The probability at least 3 glass balls are drawn is

A. 0.56

B. 0.64

C. 0.77

D. 0.82

38. A security code consists of 8 digits, which may be any number from 0 to 9. (*The first digit is allowed to be zero*) Repetitions are allowed. The probability a particular code begins with exactly two 7's, to the nearest hundredth, is
- A. 0.01
 - B. 0.03
 - C. 0.04
 - D. 0.06
39. A bookcase contains 6 different math books and 12 different physics books. If a student randomly selects two of these books, the probability they are both math books or both physics books is
- A. $\frac{1}{3}$
 - B. $\frac{4}{13}$
 - C. $\frac{2}{9}$
 - D. $\frac{9}{17}$

PART B: WRITTEN RESPONSE

1) A Principles of Math 12 student flipped a coin 14 times and recorded the results in the chart shown below

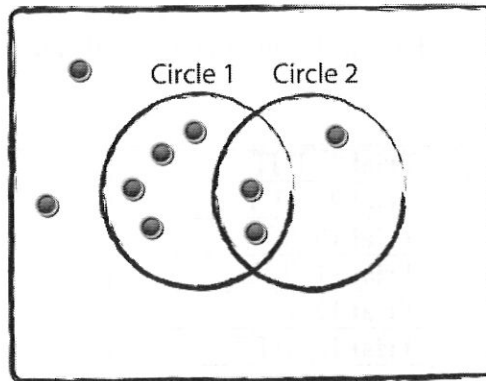
| | |
|---------------------|----------------------|
| Trial 1: TTH | Trial 8: THT |
| Trial 2: HTH | Trial 9: HTH |
| Trial 3: HHH | Trial 10: TTH |
| Trial 4: HHH | Trial 11: TTT |
| Trial 5: HTT | Trial 12: HHT |
| Trial 6: HTH | Trial 13: HTT |
| Trial 7: TTT | Trial 14: THT |

- Based on the experimental results in the chart, determine the probability of obtaining three tails on a given trial

- Using the sample space of flipping a coin three times, determine the theoretical probability of obtaining three tails.

- Briefly account the difference between the two answers.

2) In a game, discs are thrown into two circles on the other side of the room, as shown in the diagram.



- Calculate the probability of a disc being in Circle 1
- Calculate the probability of a disc being in Circle 2
- Calculate the probability of a disc being in Circle 1 **and** Circle 2
- Calculate the probability of a disc being in Circle 1 **or** Circle 2
- Calculate the probability of a disc **not** being in circle 1
- Calculate the probability of a disc **not** being in Circle 1 **or** Circle 2

3) A five card hand is dealt from a deck of 52 cards. What is the probability of receiving:

- Four aces
- Three 10's
- At most one queen
- At least three black cards

