

Probability Review Assignment**Aug 2003**

1.

A bag contains 4 white balls and 6 black balls. Two balls are drawn one at a time without replacement. What is the probability that both balls are the same colour?

A.  $\frac{2}{15}$

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

C.  $\frac{7}{15}$

D.  $\frac{8}{15}$

2.

A survey of people that live within 40 km of a ski resort found that 22% go snowboarding, 48% go skiing and 6% do both sports. Determine the probability that a randomly selected person does neither sport.

A. 24%

B. 30%

C. 36%

D. 42%

3.

Two fair coins are tossed. What is the probability that both coins are heads, given that at least one of them is a head?

A.  $\frac{1}{4}$

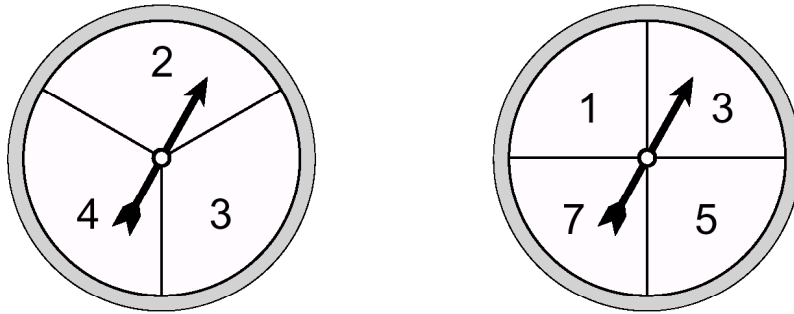
B.  $\frac{1}{3}$

C.  $\frac{1}{2}$

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


4.

In the diagram below, each spinner is spun once and the resulting numbers are added. What is the probability that the sum is an odd number?



- A.  $\frac{5}{12}$
- B.  $\frac{1}{2}$
- C.  $\frac{2}{3}$
- D.  $\frac{5}{7}$

5.

If a fair die is rolled 8 times, what is the probability of obtaining exactly two 's (5's)?

- A. 0.11
- B. 0.25
- C. 0.26
- D. 0.29

6.

A hand of five cards is dealt from a standard deck of 52 cards.

- a) What is the probability that the hand contains exactly 1 club? **(2 marks)**
- b) What is the probability that the hand contains at most 1 club? **(2 marks)**

**June 2003**

7.

A card is randomly drawn from a standard 52-card deck. Determine the probability that the card drawn is a red ace.

A.  $\frac{1}{26}$

B.  $\frac{1}{13}$

C.  $\frac{2}{13}$

D.  $\frac{4}{13}$

8.

In a recent survey it was determined that out of 100 people, 70 had eaten Chinese food in the last year, 22 had eaten Italian food, and 20 had eaten neither. How many people had eaten both Chinese and Italian food in the last year?

A. 8

B. 10

C. 12

D. 28

9.

On Friday the probability that the Flyers win their game in Prince George is  $\frac{5}{9}$  and the probability that the Bears win their game in Smithers is  $\frac{12}{17}$ . Assuming independence, what is the probability that on Friday the Flyers win their game and the Bears do not win their game?

A.  $\frac{20}{153}$

B.  $\frac{25}{153}$

C.  $\frac{105}{153}$

D.  $\frac{130}{153}$

10.

Five balls are randomly drawn without replacement from a bag containing 4 red balls and 6 black balls. What is the probability that at least 3 red balls will be drawn?

- A. 0.0238
- B. 0.2381
- C. 0.2619
- D. 0.7381

11.

Bag A contains 5 white balls and 2 green balls. Bag B contains 3 white balls and 4 green balls. A fair die is rolled and if a 1 or 2 comes up, a ball is randomly selected from Bag A; however, if a 3, 4, 5 or 6 comes up, a ball is randomly selected from Bag B.



Bag A



Bag B

- a) What is the probability of selecting a white ball? (2 marks)
- b) If a white ball is selected, what is the probability that this ball came from Bag A? (2 marks)

**April 2003**

12.

An experiment consists of tossing a fair coin and rolling a fair die. What is the probability of obtaining a head and a 5?

- A.  $\frac{1}{12}$
- B.  $\frac{1}{10}$
- C.  $\frac{7}{12}$
- D.  $\frac{2}{3}$

13.

A multiple-choice test has 10 questions. Each question has 4 choices, only one of which is correct. If a student answers each question by guessing randomly, which expression below gives the probability that the student gets exactly 7 questions correct?

A.  $\frac{{}_7C_4({}_3C_3)}{{}_{10}C_7}$

B.  $\frac{{}_4C_1({}_4C_3)}{{}_{10}C_4}$

C.  ${}_{10}C_7\left(\frac{1}{2}\right)^7\left(\frac{1}{2}\right)^3$

D.  ${}_{10}C_7\left(\frac{1}{4}\right)^7\left(\frac{3}{4}\right)^3$

14.

Six people are randomly selected from a group of 8 males and 10 females to form a committee. Determine the probability that exactly 4 males are selected for this committee.

A. 0.01

B. 0.10

C. 0.17

D. 0.32

15.

Two cards are drawn without replacement from a standard deck of 52 cards. What is the probability that the first card is a face card and the second card is a queen?

A.  $\frac{11}{663}$

B.  $\frac{3}{169}$

C.  $\frac{3}{221}$

D.  $\frac{4}{221}$

16.

A building supply store buys 40% of its pine boards from sawmill A and 60% from sawmill B. Due to pine beetle infestation, 7% of the boards from sawmill A and 5% from sawmill B have a blue discoloration. If a randomly picked board is discoloured, what is the probability that it came from sawmill A? **(4 marks)**

**January 2003**

17.

A golf putting machine is successful on 60% of its attempts at 4-metre putts. What is the probability that the machine will be successful on exactly eight of its next twelve 4-metre putts?

- A. 0.04
- B. 0.06
- C. 0.21
- D. 0.77

18.

Three cards are dealt from a standard deck of 52 cards. Determine the probability of getting at least one diamond.

- A. 0.41
- B. 0.44
- C. 0.59
- D. 0.75

19.

Jar A contains 5 red balls and 7 white balls. Jar B contains 8 red balls and 4 white balls. A fair die is rolled. If a 1 or a 2 comes up, a ball is randomly selected from Jar A, otherwise, a ball is randomly selected from Jar B.

- a) Find the probability that a white ball is selected. **(2 marks)**
- b) Given that the ball selected is white, find the probability that it came from Jar A. **(2 marks)**

20.

Two students, Peter and Ken, performed a simulation that involved the tossing of 3 coins. They recorded the number of heads and tails from 10 trials, as shown below.

Trial 1	HHT	Trial 6	THH
Trial 2	HHT	Trial 7	HTH
Trial 3	HTT	Trial 8	TTT
Trial 4	HHH	Trial 9	HHH
Trial 5	HTT	Trial 10	TTT

- According to the results from the simulation above, what is the experimental probability of getting 3 heads on a single trial?
- b) What is the theoretical probability of getting three heads on a single trial? Give your answer to three decimal places.
- c) Use the binomial probability distribution formula to determine to three decimal places the theoretical probability of flipping exactly two sets of HHH in 10 trials.

Answers:

1. C
2. C
3. B
4. C
5. C
6. a) 0.41 b) 0.63
7. A
8. C
9. B
10. C
11. a) 0.52 b) 0.45
12. A
13. D
14. C
15. A
16. 0.48
17. C
18. C
19. a)  $\frac{5}{12}$  b)  $\frac{7}{15}$
20. a) .2 b) 0.125 c) 0.242

Formulae:

$$P(\bar{A}) = 1 - P(A)$$

$$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$$

$$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$$

$$P(A \text{ and } B) = P(A) \times P(B|A)$$

Note to teachers:

The questions here come from a variety of sources. Most come from Alberta provincial exams, or are based on questions from those documents. A few came from some of my university texts.

I generally hand this out at the beginning of the unit (including the answer key), and I collect it the day of the test. I flip through the booklet just to see if there is writing on each page, and I give the students a few marks. During the unit, I have a few photocopied solution manuals (showing all my steps) floating around the class as well. Students can sign them out and take them home if they wish.

If you find any errors in the answer key, or have any suggestions that I could add, feel free to email me at [kdueck@sd42.ca](mailto:kdueck@sd42.ca) and I'll be happy to reply.

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PS Thanks to Gretchen McConnell for helping with error checking my answer keys! It's been much appreciated!