

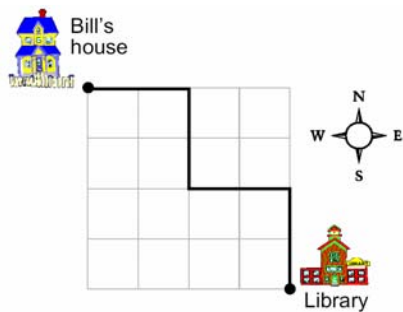
Probability Homework Booklet

- If $P(N) = \frac{1}{4}$, determine $P(\overline{N})$
A. $\frac{-1}{4}$ B. $\frac{1}{4}$ C. $\frac{3}{4}$ D. 4
- When you toss a fair die three times, what is the probability that you will get a 5 on the first toss, a 6 on the second toss, and any number except a 2 on the last toss?
A. $\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6}$ B. $\frac{1}{6} + \frac{1}{6} + \frac{1}{6}$ C. $\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{5}{6}$ D. $\frac{1}{6} + \frac{1}{6} + \frac{5}{6}$
- A pizza restaurant conducted a survey on its customers' choice of pizza toppings. The results of the survey were:
63% chose ham
26% chose pepperoni
18% chose both

What is the probability that a customer selected at random from the survey did not choose ham or pepperoni?
A. 11% B. 29% C. 53% D. 82%
- If 5 people are randomly selected from a group of 4 boys and 5 girls, determine the probability that exactly 3 girls are selected.
A. 0.08 B. 0.13 C. 0.30 D. 0.48
- Consider the four events shown below involving randomly drawing a card from a standard deck of 52 cards. Which of the events are mutually exclusive?
F: the card is a face card
K: the card is a King
S: the card is a spade
H: the card is a heart

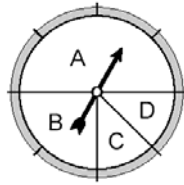
A. F and H B. F and K C. S and H D. S and K
- A box contains 3 red candies, 11 green candies and 14 black candies. If exactly two candies are randomly selected without replacement from the box, what is the probability that they are both black?
A. $\frac{13}{56}$ B. $\frac{13}{54}$ C. $\frac{1}{4}$ D. $\frac{27}{28}$

7. Two fair coins are tossed. What is the probability of 2 tails, given at least one is a tail?
- A. $\frac{1}{4}$ B. $\frac{1}{3}$ C. $\frac{1}{2}$ D. $\frac{3}{4}$
8. An experiment consists of tossing a fair coin and rolling a fair die at the same time. Determine the probability of tossing a head and rolling a 1 or a 3.
- A. $\frac{1}{12}$ B. $\frac{1}{5}$ C. $\frac{1}{6}$ D. $\frac{5}{6}$
9. Bill is walking from his house to the library. If Bill only walks south or east, determine the probability that he will select the route indicated in the diagram below. Assume that all routes have an equal chance of being chosen.



- A. $\frac{1}{20}$ B. $\frac{1}{35}$ C. $\frac{1}{53}$ D. $\frac{1}{70}$
10. If a fair coin is tossed four times, what is the probability of obtaining at least one head?
- A. $\frac{1}{16}$ B. $\frac{3}{4}$ C. $\frac{7}{8}$ D. $\frac{15}{16}$
11. If 16% of all students own a Playstation, 12% a Nintendo Game Cube and 5% own both, what percentage of students owns neither?
- A. 23% B. 33% C. 67% D. 77%
12. In a toss of a fair coin and a roll of a fair die, what is the probability that the coin comes up heads and the die comes up on odd number?
- A. $\frac{1}{12}$ B. $\frac{1}{4}$ C. $\frac{1}{2}$ D. $\frac{3}{4}$
13. In a province, 15% of grade 12 students play basketball. Two grade 12 students in the province are picked at random. Given that at least one of the students plays basketball, determine the probability that both of these students play basketball.
- A. 2.25% B. 3.11% C. 8.11% D. 17.19%

14. When the pointer is spun, determine the probability that the pointer will stop on section C.



- A. $\frac{1}{8}$ B. $\frac{1}{4}$ C. $\frac{1}{3}$ D. $\frac{1}{2}$

15. In a group of 100 children, 35 children like beans, 25 liked both beans and peas, and 5 liked neither beans nor peas. What is the probability that a randomly selected child from this group will like only peas?
- A. 0.1 B. 0.35 C. 0.45 D. 0.6
16. 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
17. 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
18. An experiment consists of tossing a fair die and rolling a fair coin. What is the probability of obtaining a head and a 5?
- A. $\frac{1}{12}$ B. $\frac{1}{10}$ C. $\frac{7}{12}$ D. $\frac{2}{3}$
19. 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. ${}_{10}C_7\left(\frac{1}{4}\right)^7\left(\frac{3}{4}\right)^3$
20. 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
21. 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 is a queen?
- A. $\frac{11}{663}$ B. $\frac{3}{169}$ C. $\frac{3}{221}$ D. $\frac{4}{221}$

22. If a fair coin is flipped four times, what is the probability of obtaining exactly two heads?

- A. $\frac{1}{16}$ B. $\frac{1}{8}$ C. $\frac{3}{8}$ D. $\frac{1}{2}$

23. Two cards are drawn from a well-shuffled deck of 52 cards. What is the probability that the first card is a heart and the second card is a heart if the experiment is carried out without replacement?

- A. $\frac{1}{16}$ B. $\frac{13}{204}$ C. $\frac{1}{17}$ D. $\frac{3}{52}$

24. Three different names are randomly selected from the following list of five names:

{Max, Kim, Codie, Lee, Alex}

Determine the probability that “Kim” is one of the three names selected.

- A. $\frac{3}{10}$ B. $\frac{2}{5}$ C. $\frac{1}{2}$ D. $\frac{3}{5}$

Written Questions

1. A tetrahedral die has four sides numbered 1, 2, 3, and 4. Two tetrahedral die are rolled. The sample space is shown below.

Determine the probability that:

- a) the sum of the two dice is equal to 6.
- b) the product of the two dice is a multiple of 3.
- c) the number showing up on the first die is greater than the number showing up on the second die.
- d) the sum of the two die is equal to 6 or the product of the two die is a multiple of 3.
- e) the first die is a 4 given that the sum of the two die is equal to 6.

		2nd die			
		1	2	3	4
1st die	1	(1, 1)	(1, 2)	(1, 3)	(1, 4)
	2	(2, 1)	(2, 2)	(2, 3)	(2, 4)
	3	(3, 1)	(3, 2)	(3, 3)	(3, 4)
	4	(4, 1)	(4, 2)	(4, 3)	(4, 4)

2. A hand of 5 cards is dealt from a standard deck of cards.
- a) What is the probability that the hand contains 5 spades? (Answer accurate to at least 4 decimal places.)
- b) What is the probability that the hand contains 2 hearts, 2 spades and 1 card that is not a heart or a spade? (Answer accurate to at least 4 decimal places.)
3. The probability of winning a game is 0.7. You play 3 games. (Answer all parts of the question accurate to at least 3 decimal places.)
- a) What is the probability that you win all 3 games?
- b) What is the probability that you win at least twice?
- c) If you win at least twice, what is the probability that you will have 3 wins?

4. A test for Type 2 diabetes measures the blood glucose level after eight hours of fasting. Consider a blood glucose level above normal to be a positive result and anything else to be a negative result. This test is 85% accurate and 2% of the world's population has Type 2 diabetes. Determine the probability that a person who tests negative for Type 2 diabetes does not have the disease.
5. Two basketball players, Cole and Amanda, each independently shoot a free throw at a basket. Cole has a $\frac{2}{3}$ chance of making the free throw and Amanda has a $\frac{3}{5}$ chance of making the free throw. What is the probability that at least one of them will make the free-throw shot?
6. 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 for Jar A, otherwise a ball is randomly selected from Jar B.
- Find the probability that a white ball is selected.
 - Given that the ball selected is white, find the probability that it came from Jar A.

7. 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?
8. Two factories produce safety pins. 65% of the safety pins come from factory A and the rest of the safety pins come from factory B. In factory A, 2% of the pins are defective; in factory B, 7% of the pins are defective. What is the probability that a defective pin comes from factory A?

Key

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|-------|-------|-------|-------|-------|-------|-------|-------|
| 1. C | 2. C | 3. B | 4. D | 5. C | 6. B | 7. B | 8. C |
| 9. D | 10. D | 11. D | 12. B | 13. C | 14. A | 15. D | 16. C |
| 17. C | 18. A | 19. D | 20. C | 21. A | 22. C | 23. C | 24. D |

- | | | | | | | | | | |
|-----|----------------|-----|----------------|-----|----------------|-----|----------------|-----|---------------|
| 1a) | | 1b) | | 1c) | | 1d) | | 1e) | |
| | $\frac{3}{16}$ | | $\frac{7}{16}$ | | $\frac{6}{16}$ | | $\frac{9}{16}$ | | $\frac{1}{3}$ |

2a) 0.000495 2b) 0.0609

3a) 0.343 3b) 0.784 3c) 0.4375

4. $\frac{(0.98)(0.85)}{(0.02)(0.15) + (0.98)(0.85)} = 0.99641$

5. $1 - \frac{1}{3} \left(\frac{2}{5} \right) = 1 - \frac{2}{15} = \frac{13}{15}$ or $\left(\frac{2}{3} \right) \left(\frac{2}{5} \right) + \left(\frac{1}{3} \right) \left(\frac{3}{5} \right) + \left(\frac{2}{3} \right) \left(\frac{3}{5} \right) = \frac{13}{15}$

6a)		6b)	
	$\frac{5}{12}$		$\frac{7}{15}$

7. 0.48

8. 0.35