

Mathematics 3201 Unit 3 Review: Probability

Key

- Given the following probabilities, which event is most likely to occur?
 A. $P(A) = 0.2$ B. $P(B) = \frac{1}{6}$ C. $P(C) = 0.3$ **D. $P(D) = \frac{1}{3}$** *largest #*
- Three events, A , B , and C , are all equally likely. If there are no other possible events, which of the following statements is true?
 A. $P(A) = 0$ **B. $P(B) = \frac{1}{3}$** C. $P(C) = 1$ D. $P(A) = 3$
- The odds in favour of Macy passing her driver's test on the first try are 7 : 4. Determine the odds against Macy passing her driver's test on the first try.
A. 4 : 7 B. 4 : 11 C. 7 : 11 D. 3 : 11
- The odds in favour of Macy passing her driver's test on the first try are 7 : 4. Determine the probability that she will pass her driver's test.
 A. 0.226 B. 0.364 C. 0.571 **D. 0.636** $\frac{7}{11}$
- Julie draws a card at random from a standard deck of 52 playing cards. Determine the probability of the card being a diamond.
A. 0.250 B. 0.500 C. 0.625 D. 0.750 $\frac{13}{52}$
- The weather forecaster says that there is an 80% probability of rain tomorrow. Determine the odds against rain.
 A. 4 : 5 B. 4 : 1 C. 1 : 5 **D. 1 : 4** $\frac{20:80}{2:8} = 1:4$
- Nine boys and twelve girls have signed up for a trip. Only six students will be selected to go on the trip. Determine the probability that only boys will be on the trip.
 A. 0.02% B. 0.08% **C. 0.15%** D. 0.23% $\frac{{}^9C_6}{{}^{21}C_6}$
- Select the events that are mutually exclusive.
 - Drawing a 7 or drawing a heart from a standard deck of 52 playing cards.
 - Rolling a sum of 4 or rolling an even number with a pair of four-sided dice, numbered 1 to 4.
 - Drawing a black card or drawing a Queen from a standard deck of 52 playing cards.
 - D. Rolling a sum of 8 or a sum of 11 with a pair of six-sided dice, numbered 1 to 6.**
- Josie is about to draw a card at random from a standard deck of 52 playing cards. Determine the probability that she will draw a red card or a 7.
 A. $\frac{1}{13}$ B. $\frac{1}{2}$ **C. $\frac{7}{13}$** D. $\frac{15}{26}$ $\frac{26}{52} + \frac{4}{52} - \frac{2}{52}$ *overlap*
- Helen is about to draw a card at random from a standard deck of 52 playing cards. Determine the probability that she will draw a black card or a spade.
 A. $\frac{1}{4}$ **B. $\frac{1}{2}$** C. $\frac{29}{52}$ D. $\frac{5}{6}$ $\frac{26}{52} + \frac{13}{52} - \frac{13}{52}$ *overlap*

11. Hilary draws a card from a well-shuffled standard deck of 52 playing cards. Then she draws another card from the deck without replacing the first card. Determine the probability that both cards are hearts.

A. $\frac{1}{20}$

B. $\frac{1}{17}$

C. $\frac{1}{12}$

D. $\frac{1}{8}$ $\frac{13}{52} \times \frac{12}{51}$

12. Min draws a card from a well-shuffled standard deck of 52 playing cards. Then she puts the card back in the deck, shuffles again, and draws another card from the deck. Determine the probability that both cards are face cards.

A. $\frac{1}{125}$

B. $\frac{9}{169}$

C. $\frac{7}{99}$

D. $\frac{4}{25}$ $\frac{12}{52} \times \frac{12}{52}$

13. Select the events that are dependent.

A. Drawing a face card from a standard deck of 52 playing cards, putting it back, and then drawing another face card.

B. Rolling a 4 and rolling a 3 with a pair of six-sided dice, numbered 1 to 6.

C. Drawing a heart from a standard deck of 52 playing cards, putting it back, and then drawing another heart.

D. Rolling a 3 and having a sum greater than 5 with a pair of six-sided dice, numbered 1 to 6.

14. Select the events that are independent.

A. Drawing a 10 from a standard deck of 52 playing cards and then drawing another card, without replacing the first card.

B. Rolling a 4 and rolling a 5 with a pair of six-sided dice, numbered 1 to 6.

C. Choosing a number between 1 and 20 with the number being a multiple of 3 and also a multiple of 9.

D. Drawing a diamond from a standard deck of 52 playing cards and then drawing another diamond, without replacing the first card.

15. A three-colour spinner is spun, and a die is rolled. Determine the probability of spinning blue and rolling a 4.

A. 1.24%

B. 5.56%

C. 7.17%

D. 9.82%

$\frac{1}{3} \times \frac{1}{6} = \frac{1}{18}$
 $= 0.055\bar{6} = 5.5\bar{6}\%$

16. Two cards are drawn, without being replaced, from a standard deck of 52 playing cards. Determine the probability of drawing a face card then drawing an even-numbered card.

A. 1.96%

B. 9.05%

C. 14.32%

D. 23.08%

$\frac{12}{52} \times \frac{20}{51} = 0.09057$

17. Select the independent events.

A. $P(A) = 0.22$, $P(B) = 0.39$, and $P(A \cdot B) = 0.072$

B. $P(A) = 0.18$, $P(B) = 0.7$, and $P(A \cdot B) = 0.163$

C. $P(A) = 0.51$, $P(B) = 0.1$, and $P(A \cdot B) = 0.069$

D. $P(A) = 0.9$, $P(B) = 0.23$, and $P(A \cdot B) = 0.207$

$0.9 \times 0.23 = 0.207$

18. There are three children in the Jaffna family. Determine the probability that they have two boys and a girl.

A. 12.5%

B. 25%

C. 37.5%

D. 50%

19. Josephine plays ringette. She has scored 3 times in 15 shots on goal. She says that the odds in favour of her scoring are 1 to 5. Is she right? Explain.

No, should be 1:4, she used total instead of unfavorable

20. A credit card company randomly generates temporary four-digit pass codes for cardholders. Serena is expecting her credit card to arrive in the mail. Determine the probability that her pass code will consist of four different odd digits.

$$\frac{3}{250} \text{ OR } 0.012 \text{ OR } 1.2\%$$

$$\frac{5 \ 4 \ 3 \ 2}{10 \ 10 \ 10 \ 10}$$

21. From a committee of 12 people, 3 of these people are randomly chosen. Determine the probability that Pavel, Rashida, and Jerry will be chosen.

$$\frac{1}{220} \text{ OR } 0.0045 \text{ OR } 0.45\%$$

22. Access to a particular online game is password protected. Every player must create a password that consists of three capital letters followed by two digits. Repetitions are NOT allowed in a password. Determine the probability that a password chosen at random will contain the letters J, K, and L.

$$\frac{540}{1404000} \text{ OR } 0.0003846 \text{ OR } 0.038\%$$

23. Ashley has letter tiles that spell NAPKIN. She has selected three of these tiles at random. Determine the probability that the tiles she selected are two consonants and one vowel.

$$\frac{12}{20} = \frac{3}{5} \text{ OR } 0.6 \text{ OR } 60\%$$

24. Five friends, including Hilary and Annie, are sitting in a row at a movie theatre.

a) Determine the probability that Hilary and Annie are sitting together.

$$\frac{48}{120} = \frac{2}{5} \text{ OR } 0.4 \text{ OR } 40\%$$

b) Determine the probability that Hilary and Annie are not sitting together.

$$\frac{3}{5} \text{ OR } 0.6 \text{ OR } 60\%$$

25. The probability that Eva will go to the gym on Saturday is 0.63. The probability that she will go shopping on Saturday is 0.5. The probability that she will do neither is 0.3. Determine the probability that Eva will do at least one of these activities on Saturday.

$$0.7$$

26. The probability that Randy will study on Friday night is 0.3. The probability that he will play video games on Friday night is 0.7. The probability that he will do at least one of these activities is 0.9. Determine the probability that he will do both activities.

$$0.1$$

27. Leslie has four identical black socks and six identical white socks loose in her drawer. She pulls out one sock at random and then another sock, without replacing the first sock. Determine, to the nearest tenth of a percent, the probability that she pulls out a pair of black socks.

$$\frac{12}{90} = \frac{2}{15} \text{ OR } 0.13 \text{ OR } 13\%$$

28. A four-colour spinner is spun, and a four-sided die is rolled. Determine the probability of spinning green and rolling a 3.

$$\frac{1}{16} \text{ OR } 6.25\%$$

29. Greg, Bogdan, Dave, and Li are competing with eight other boys to be on their school's cross-country team. All the boys have an equal chance of winning the trial race. Determine the probability that Greg, Bogdan, Dave, and Li will place first, second, third, and fourth in any order. Show your work.

$$\frac{1}{495} = 0.002 \text{ OR } 0.2\%$$

$$\frac{3C3}{12C3}$$

$$\frac{3 \ 2 \ 1}{26 \ 25 \ 24} \quad \frac{10 \ 9}{10 \ 9}$$

30. A student council consists of 12 girls and 8 boys. To form a subcommittee, 4 students are randomly selected from the council. Determine the odds in favour of 3 girls and 1 boy being on the subcommittee. Show your work.

$$352 : 617$$

31. The probability that a plane will leave Winnipeg on time is 0.80. The probability that a plane will leave Winnipeg on time and arrive in Calgary on time is 0.42. Determine the probability that a plane will arrive in Calgary on time, given that it left Winnipeg on time. Show your work.

$$0.525 \text{ or } 52.5\%$$

$$P(C|W) = \frac{0.42}{0.80} =$$

32. A paper bag contains a mixture of three types of treats: 12 granola bars, 10 fruit bars, and 8 cheese strips. Suppose that you play a game in which a treat is randomly taken from the bag and replaced, and then a second treat is drawn from the bag. You are allowed to keep the second treat only if it was the same type as the treat that was drawn the first time. Determine the probability that you will be able to keep a granola bar. Show your work.

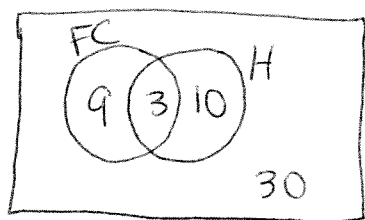
$$0.16 \text{ or } 16\%$$

$$\frac{12}{30} \times \frac{12}{30}$$

33. Based on a soccer team's record, it has a 70% chance of winning on days without rain and a 50% chance of winning on days with rain. The forecast for Friday indicates a 20% chance of rain. What is the probability that the soccer team will win on Friday?

$$0.66 \text{ or } 66\%$$

34. a)



b) No, there are cards that are face cards and hearts

$$b) \frac{22}{52} = \frac{11}{26} \text{ or } 0.423 \text{ or } 42.3\%$$