

Homework 5.2 Independent and Dependent Events

Calculate the probability.

1. Two 1–6 number cubes are rolled—one is black and one is white. You want to know the probability of the sum of the rolls being greater than or equal to 6 and the black cube showing a 3.
 - a. Are the events independent or dependent? Explain.

 - b. Find the probability. _____

2. Randy has 4 pennies, 2 nickles, and 3 dimes in his pocket. If he randomly chooses 2 coins, what is the probability that they are both dimes if he doesn't replace the first one? _____

3. A coin is tossed and a 6-sided die is rolled. Find the probability of landing on the head side of the coin and rolling a 3 on the die.

4. A card is chosen at random from a deck of 52 cards. It is then replaced and a second card is chosen. What is the probability of choosing a jack and an eight?

5. A school survey found that 9 out of 10 students like pizza. If three students are chosen at random with replacement, what is the probability that all three students like pizza?

6. A jar contains 3 red, 5 green, 2 blue and 6 yellow marbles. A marble is chosen at random from the jar. A second marble is chosen without replacing the first one. What is the probability of choosing a green and a yellow marble?

Calculate the probability.

1. Two 1–6 number cubes are rolled—one is black and one is white. You want to know the probability of the sum of the rolls being greater than or equal to 6 and the black cube showing a 3.

a. Are the events independent or dependent? Explain.

The events are independent as the outcome of the first event does not affect the outcome of the second event.

b. Find the probability. $\frac{13}{162}$

2. Randy has 4 pennies, 2 nickles, and 3 dimes in his pocket.

If he randomly chooses 2 coins, what is the probability that they are both dimes if he does replace the first one?

$$\frac{1}{9}$$

3. A coin is tossed and a 6-sided die is rolled. Find the probability of landing on the head side of the coin and rolling a 3 on the die.

$$\frac{1}{12}$$

4. A card is chosen at random from a deck of 52 cards. It is then replaced and a second card is chosen. What is the probability of choosing a jack and an eight?

$$\frac{1}{169}$$

5. A school survey found that 9 out of 10 students like pizza. If three students are chosen at random with replacement, what is the probability that all three students like pizza?

$$\frac{7}{10}$$

6. A jar contains 3 red, 5 green, 2 blue and 6 yellow marbles. A marble is chosen at random from the jar. A second marble is chosen without replacing the first one. What is the probability of choosing a green and a yellow marble?

$$\frac{1}{8}$$

Homework 5.2 Independent and Dependent Events (Page 2)

7. An aquarium contains 6 male goldfish and 4 female goldfish. You randomly select a fish from the tank, do not replace it, and then randomly select a second fish. What is the probability that both fish are male?
8. A random sample of parts coming off a machine is done by an inspector. He found that 5 out of 100 parts are bad on average. If he were to do a new sample, what is the probability that he picks a bad part and then, picks another bad part if he doesn't replace the first?
9. Are the following events below independent?

a. $P(A) = 0.85$ $P(B) = 0.88$ $P(A \cap B) = 0.75$

b. $P(A) = 0.14$ $P(B) = 0.25$ $P(A \cap B) = 0.035$

c. $P(A) = \frac{2}{5}$ $P(B) = \frac{3}{7}$ $P(A \cap B) = \frac{5}{35}$

d. $P(A) = \frac{5}{8}$ $P(B) = \frac{2}{5}$ $P(A \cap B) = \frac{1}{4}$

10. Determine the missing values so that the events A and B will be independent.

a. $P(A) = 0.55$ $P(B) = \underline{\hspace{2cm}}$ $P(A \cap B) = 0.1375$

b. $P(A) = \underline{\hspace{2cm}}$ $P(B) = 3/10$ $P(A \cap B) = 1/7$

11. A random survey was conducted about gender and hair color. This table records the data.

Hair Color			
	Brown	Blonde	Red
Male	548	876	82
Female	612	716	66

Are having red hair and being female independent events?

7. An aquarium contains 6 male goldfish and 4 female goldfish. You randomly select a fish from the tank, do not replace it, and then randomly select a second fish. What is the probability that both fish are male?

$$\frac{1}{3}$$

8. A random sample of parts coming off a machine is done by an inspector. He found that 5 out of 100 parts are bad on average. If he were to do a new sample, what is the probability that he picks a bad part and then, picks another bad part if he doesn't replace the first?

$$\frac{1}{495}$$

9. Are the following events below independent?

- a. $P(A) = 0.85$ $P(B) = 0.88$ $P(A \cap B) = 0.75$ **The events are independent**
- b. $P(A) = 0.14$ $P(B) = 0.25$ $P(A \cap B) = 0.035$ **The events are independent**
- c. $P(A) = \frac{2}{5}$ $P(B) = \frac{3}{7}$ $P(A \cap B) = \frac{5}{35}$ **The events are not independent**
- d. $P(A) = \frac{5}{8}$ $P(B) = \frac{2}{5}$ $P(A \cap B) = \frac{1}{4}$ **The events are independent**

10. Determine the missing values so that the events A and B will be independent.

c. $P(A) = 0.55$ $P(B) = \underline{0.25}$ $P(A \cap B) = 0.1375$

d. $P(A) = \underline{\frac{10}{21}}$ $P(B) = 3/10$ $P(A \cap B) = 1/7$

11. A random survey was conducted about gender and hair color. This table records the data.

		Hair Color		
		Brown	Blonde	Red
Male		548	876	82
Female		612	716	66

Are having red hair and being female independent events? **The events are not independent**

Homework 5.2 Independent and Dependent Events (Page 3)

A survey was done of 90 junior and senior boys at Lincoln High School asking whether they liked basketball or football better. This table shows the data that was collected.

	Basketball	Football
Junior	10	20
Senior	20	40

12. Are liking basketball and being a junior independent events?

13. Are liking football and being a junior independent events?

Let event M = taking a math class. Let event S = taking a science class. Then, M and S = taking a math class and a science class.

Suppose $P(M) = 0.6$, $P(S) = 0.5$, and $P(M \text{ and } S) = 0.3$.

14. Are M and S independent?

Conclusion:

In a class, 60% of the students are female. 50% of all students in the class have long hair. 45% of the students are female and have long hair. Of the female students, 75% have long hair. Let F be the event that the student is female. Let L be the event that the student has long hair. One student is picked randomly.

15. Are the events of being female and having long hair independent?

Conclusion:

A survey was done of 90 junior and senior boys at Lincoln High School asking whether they liked basketball or football better. This table shows the data that was collected.

	Basketball	Football
Junior	10	20
Senior	20	40

12. Are liking basketball and being a junior independent events? **The events are independent**

13. Are liking football and being a junior independent events? **The events are independent**

Let event M = taking a math class. Let event S = taking a science class. Then, M and H = taking a math class and a science class.

Suppose $P(M) = 0.6$, $P(S) = 0.5$, and $P(M \text{ and } S) = 0.3$.

14. Are M and S independent?

Conclusion: **The events are not independent. Explanations may vary**

In a class, 60% of the students are female. 50% of all students in the class have long hair. 45% of the students are female and have long hair. Of the female students, 75% have long hair. Let F be the event that the student is female. Let L be the event that the student has long hair. One student is picked randomly.

15. Are the events of being female and having long hair independent?

Conclusion: **The events are not independent, Explanations may vary**