

**Day 2 Homework Answers:**

1.  $1/12$
2.  $1/32$ ; I would be suspicious because the likelihood of this happening is pretty low (3%)
3.  $1/216$ ; I would be very suspicious because the likelihood of this happening is extremely low (.5%)
4. .2905
- 5a. Yes because one spinner result does not affect the next.
  - b. .0625
  - c. .004
  - d. .237

Day 2 HomeworkAnswersUse the Multiplication Rule for Independent Events

1. A number cube has faces numbered 1 through 6, and a coin has two sides, heads and tails. Find the probability that the cube shows a 4, and the coin lands heads.

Are the events independent? *Yes cube roll does not affect coin (and reverse)*

$$\begin{aligned} \text{The } P(4 \text{ and a head}) &= P(4) \times P(H) \\ &= \frac{1}{6} \times \frac{1}{2} = \frac{1}{12} \end{aligned}$$

2. If you toss the coin five times, what is the probability you will see a head on all five tosses?

$$P(H, H, H, H, H) = \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} \times \frac{1}{2} = \left(\frac{1}{32}\right) \sim .03 \sim 3\%$$

If you tossed the coin five times and got five heads, would you think that this coin is a fair coin? Explain.

3. If you roll the number cube three times, what is the probability that it will show 4 on all three rolls?

$$P(4, 4, 4) = \frac{1}{6} \times \frac{1}{6} \times \frac{1}{6} = \frac{1}{216} \sim .005 \sim .5\%$$

If you rolled the number cube three times and got a 4 on all three rolls, would you think that this number cube is fair? Explain.

4. Suppose a credit card company states that when a customer is selected at random, the probability that the customer pays his or her bill in full each month is 0.35, the probability that the customer makes regular online purchases is 0.83, and these two events are independent. What is the probability that a randomly selected customer pays his or her bill in full each month and makes regular online purchases?

$$\begin{aligned} P(F \text{ and } O) &= P(F) \times P(O) \\ &= .35 \times .83 \\ &= .2905 \end{aligned}$$

5. A spinner has a pointer, and when the pointer is spun, the probability that it stops in the red section of the spinner is 0.25.

a. If the pointer is spun twice, are the 2 events independent? Explain.

yes - one spin doesn't affect the prob. of the next spin

b. If the pointer is spun twice, what is the probability that it will stop in the red section on both occasions?

$$P(R, R) = .25 \times .25 = .0625$$

c. If the pointer is spun four times, what is the probability that it will stop in the red section on all four occasions? (Round your answer to the nearest thousandth)

$$P(R, R, R, R) = .25 \times .25 \times .25 \times .25 = .004$$

d. If the pointer is spun five times, what is the probability that it never stops on red? (Round your answer to the nearest thousandth)

$$P(\text{not } R) = 1 - P(R) = 1 - .25 = .75$$

$$P(\text{not } R, \text{not } R, \text{not } R, \text{not } R, \text{not } R) = .75 \times .75 \times .75 \times .75 \times .75 = .237$$

## Day 3 - More Probability and/or Practice

1. A number cube has faces numbered 1 - 6.

- a. If the number cube is rolled once, then the events the result is even and the result is 5 are disjoint (disjoint or not disjoint?).

Explain.

Can't be both Even  
and 5

↓  
mutually Exclusive  
(No both)



- b. The events the result is even and the result is greater than 4 are Not disjoint (disjoint or not disjoint?). Explain.

Can be both Even and greater than 4  
Ex: 6

2. A set of 40 cards consists of:

o 10 black cards showing squares

o 10 red cards showing star

o 10 black cards showing diamonds

o 10 red cards showing diamonds

- a. A card is selected at random from the set. Find the probability that the card is black or shows a star.

$$\begin{aligned} P(\text{Black or Star}) &= P(\text{Black}) + P(\text{Star}) - \cancel{P(\text{Black Star})} \\ &= \frac{20}{40} + \frac{10}{40} \\ &= \frac{30}{40} \end{aligned}$$

Disjoint

- b. A card is selected at random. Find the probability that the card is red or shows a diamond.

$$\begin{aligned} P(\text{Red or Diamond}) &= P(\text{Red}) + P(\text{Diamond}) - P(\text{Red and Diam}) \\ &= \frac{20}{40} + \frac{20}{40} - \frac{10}{40} \\ &= \frac{30}{40} \end{aligned}$$

Not Disjoint

3. When a call is received at an airline's call center, the probability that it comes from abroad is 0.32, and the probability that it is to make a change to an existing reservation is 0.38. The probability that a call is both from abroad and is to make a change to an existing reservation is 0.15. Calculate the probability that a randomly selected call is either from abroad or is to make a change to an existing reservation.

$$\begin{aligned} P(\text{abroad or Change Res}) &= P(\text{abroad}) + P(\text{change Res}) - P(\text{Both}) \\ &= .32 + .38 - .15 \\ &= .55 \end{aligned}$$

not disjoint

4. An animal hospital has 5 dogs and 3 cats out of 10 animals in the hospital. What is the probability that an animal selected at random is a dog or a cat? Think: Could an animal be both a dog and a cat?

$$\begin{aligned} P(D \text{ or } C) &= P(D) + P(C) - P(\overset{0}{D \text{ and } C}) \\ &= \frac{5}{10} + \frac{3}{10} \\ &= \frac{8}{10} \end{aligned}$$

Homework - Day 3 Homework  
WKST

$$\begin{aligned} \#3) \quad a) \quad P(14) &= P(7 \text{ and } 7) = \frac{1}{5} \times \frac{1}{5} = \frac{1}{25} \\ b) \quad P(12) &= P(6 \text{ and } 6) \text{ or } P(7 \text{ and } 5) \text{ or } P(5 \text{ and } 7) \\ &= \left( \frac{1}{5} \times \frac{1}{5} \right) + \left( \frac{1}{5} \times \frac{1}{5} \right) + \left( \frac{1}{5} \times \frac{1}{5} \right) \\ &= \frac{3}{25} \end{aligned}$$



### **Day 3 Homework Answers:**

1. C

5.  $45/100$

2. C

6. .35, .85

3.  $3/25$

7.  $7/10$

4. .72, .98