
For each of the following problems circle T if the given statement is always true and F if the statement is sometimes false. There is no partial credit on this part of the quiz.

1. T F Roll two dice. The probability of rolling a sum of 8 is $\frac{6}{36}$.

There are 36 ways to roll two dice. Of those, the following ordered pairs represent the ways to get a sum of 8:

(2, 6)

(6, 2)

(3, 5)

(5, 3)

(4, 4)

so there are 5 ways to roll a sum of 8, making the probability $\frac{5}{36}$. Therefore, this is FALSE.

2. T F Flip two coins. The probability of getting the same outcome on both coins is $\frac{1}{4}$.

The sample space is $\{HH, HT, TH, TT\}$ so there are 4 elements of the sample space. Two of them are HH and TT, therefore getting the same outcome on both coins. Therefore, the probability of getting the same outcome on both coins is $\frac{2}{4}$.

Complete the following problems. Show all work and explain your reasoning.

3. Three fair coins are tossed.

- (a) Write out the sample space.

$$S = \{HHH, HHT, HTH, THH, HTT, THT, TTH, TTT\}$$

- (b) Find the probability of getting no heads.

This is the all tails events above, so there is one way for this event to happen, making the probability $\frac{1}{8}$

- (c) Find the probability of getting exactly one head.

There are 3 ways for this to happen, so the probability is $\frac{3}{8}$

- (d) Find the probability of getting at least one head.

At least one head means one head or two heads or three heads. From the list above, this is the event $E = \{HHH, HHT, HTH, THH, HTT, THT, TTH\}$, so there are 7 elements in this event. Therefore, the probability is $\frac{7}{8}$.