

Tools of Chance

Use the coin, die, or card shown to find each probability.



Name _____

Date _____

Show your method

Write $P(\text{event})$ as favourable outcomes over total outcomes, then simplify. A standard deck has 52 cards (no jokers): 4 suits of 13 cards each.

Worked example Find $P(\text{rolling a 3})$ on a fair die.



Face 3

Favourable outcomes: 1 (rolling a 3)

Total outcomes: 6

$$P(3) = \frac{1}{6}$$

1. Find $P(\text{Tails})$.

Solution: $\frac{1}{2}$



Heads Tails

2. Find $P(\text{rolling an odd number})$.

Solution: $\frac{3}{6} = \frac{1}{2}$



Face 1 Face 3 Face 5

3. Find $P(\text{drawing an Ace})$.

Solution: $\frac{4}{52} = \frac{1}{13}$



4. Find $P(\text{drawing a Diamond})$.

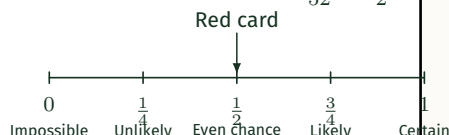
Solution: $\frac{13}{52} = \frac{1}{4}$



Diamonds RED

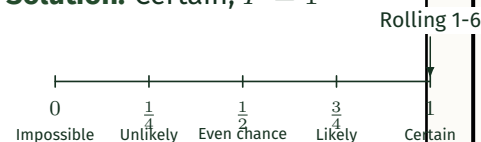
5. Where does "drawing a red card" sit? Find its probability.

Solution: Even chance, $\frac{26}{52} = \frac{1}{2}$



6. Where does "rolling 1 to 6" sit? Find its probability.

Solution: Certain, $P = 1$



7. Two coins are flipped. Find $P(\text{two Heads})$.

Solution: $\frac{1}{4}$



H = Heads; T = Tails; 1-6 = die.

8. One of these three cards is picked at random. Find $P(\text{picking a Spade})$.

Solution: $\frac{1}{3}$



Hearts RED Spade BLACK Clubs BLACK

9. What is $P(\text{drawing a black King})$ from a standard deck?

Solution: $\frac{2}{52} = \frac{1}{26}$

Tools of Chance (continued)

Solutions: coins, dice, and cards.



Name _____

Date _____

10. What is $P(\text{rolling a multiple of 3})$ on a fair die?

Solution: $\frac{2}{6} = \frac{1}{3}$

11. What is $P(\text{drawing a Jack})$?

Solution: $\frac{4}{52} = \frac{1}{13}$

12. Is rolling a number less than 7 on a fair die certain, likely, unlikely, or impossible?

Solution: Certain

13. List the sample space when a coin is flipped and a die is rolled (12 outcomes).

Solution:

H1,H2,H3,H4,H5,H6,T1,T2,T3,T4,T5,T6

14. Two dice are rolled. What is $P(\text{both show a 6})$?

Solution: $\frac{1}{36}$

15. What is $P(\text{drawing a card that is a Queen or a King})$?

Solution: $\frac{8}{52} = \frac{2}{13}$

16. A die is rolled 30 times. Based on theoretical probability, how many times would you expect an even number?

Solution: $30 \times \frac{1}{2} = 15$

17. Are "drawing a Heart" and "drawing a Club" mutually exclusive? Explain.

Solution: Yes – no card is both a Heart and a Club

18. What is $P(\text{NOT drawing a face card – Jack, Queen, or King})$?

Solution: $1 - \frac{12}{52} = \frac{40}{52} = \frac{10}{13}$