

Probability

You have learned how to determine probability both for a single event and for a compound event (more than one event). As you have learned, you have to be careful not to double-count possibilities (ex: junior girls being counted in the junior group and the girl group—you have to subtract them from one of the groups!). You also have to watch out for **dependent events**. Dependent events are probabilities that *depend* (or, are changed by) one another. For example, if you pull two cards out of a deck of 52 cards, the number of possibilities for the second card *is changed by* the first card, which was removed. For the first card, there were 52 in the deck. Now that you took it out, there are only 51.

EXAMPLE

If there are two red pens and one black pen in a bag, what is the probability that you will pull out a red pen and then pull out another red pen?

This is a compound probability. First, you need the probability of a red pen: $P(r) = \frac{2}{3}$.

*The second pen, though, is being removed **after** the first red pen came out. So the number of possibilities has changed.*

Now, there is only one red pen in a bag of two total. $P(r \text{ after } r) = \frac{1}{2}$

$$\text{The compound probability is: } P(r)P(r \text{ after } r) = \left(\frac{2}{3}\right)\left(\frac{1}{2}\right) = \frac{2}{6} = \boxed{\frac{1}{3}}$$

Determine probability as a **fraction, decimal and percent**. *Be careful: the problems below are mixed—some are compound, and some aren't; some are dependent, and some aren't.*

<p>1. A spinner has 12 equal sections: five green 7s, three black 5s, two green 5s, and two blank sections. Determine the probability that the spinner will land on a green section or a 5.</p>	<p>2. A number cube is rolled 6 times. Determine the probability that it will roll one 3 and five even numbers.</p>	<p>3. Two jokers are added to a deck of 52 cards. Determine the probability that a person who picks two cards will pull out a joker and then, without replacing it, pull out a joker.</p>
<p>4. There are seven pens in a bag. Five of them are blue. What is the probability that a person will pull out a blue pen the first time, put it back, and then pull out a different blue pen?</p>	<p>5. There are 5 pairs of socks in a drawer: 3 white, 1 black, and 1 blue. What is the probability that a pair of black and two pairs of white socks will be chosen at random, if none of the socks are put back in the drawer?</p>	<p>6. If four students are chosen at random from a group of 3 freshmen and 8 juniors, what is the probability that all of them will be juniors?</p>

<p>7. A number cube is rolled 3 times. What is the probability that the first roll will be a multiple of 2, the second roll will be a 4, and the third roll will be an 8?</p>	<p>8. A spinner has 10 equal sections numbered 1-10. What is the probability of the spinner landing on a 2, a 5, a 6, or a 9?</p>	<p>9. There are 12 face cards in a deck of 52. Of those face cards, 6 are red. What is the probability that a card picked at random will be a black face card?</p>
<p>10. If a number cube is rolled 3 times, what is the probability that it will roll a 4, an odd, and a factor of 8?</p>	<p>11. There are four of each card in a deck of 52 cards. What is the probability that a card chosen at random will be a 7?</p>	<p>12. There are four of each card in a deck of 52 cards. What is the probability that two cards chosen at random will be two 7s, if the first card is not replaced in the deck?</p>
<p>13. In a closet, there are 4 pairs of shoes—1 pair of heels, 2 pairs of sneakers, and 1 pair of sandals. What is the probability that a pair of shoes chosen at random will be sneakers or sandals?</p>	<p>14. There are seven people, including James, entered in a raffle. If three tickets are chosen at random, what is the probability that James' ticket will not be chosen as any of the three winners?</p>	<p>15. The alphabet has 26 letters. What is the probability that 4 letters chosen at random will be M, A, T, & H, if no letter can be chosen twice?</p>