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.

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

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.*

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| 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. | 2. A number cube is rolled 6 times. Determine the probability that it will roll one 3 and five even numbers. | 3. Two jokers are added to a pile of 20 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. |
| 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? | 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? | 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? |
| 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? | 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? | 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? |
| 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? | 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? | 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? |
| 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? | 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? | 15. The alphabet has 26 letters. 21 of them are consonants, and 5 of them are vowels. What is the probability that 2 letters chosen at random will both be vowels, if no letter can be chosen twice? |