

Compound Probability

Up to this point, you have been working with isolated events. You have found the probability of *one thing* happening. The next step is to learn how to determine **compound probability**, or the probability of more than one event happening. For example, if you toss a coin twice, the probability of getting heads **and** tails is a **compound probability**. The word “and” tells you you’re working with compound probability.

To determine compound probability, **multiply** the probability of the first event with the probability of the next event (and continue multiplying for every event that is desired).

Determine the compound probability as a **fraction**, a **decimal**, and a **percent**.

<p><b>EX</b> If you roll a number coin three times, what is the probability of rolling a 6, an odd number, and a 2?</p> <p><i>“And” makes it compound, so I will determine the probability of each, and then multiply them.</i></p> <p>Probability of a 6: <math>P(6) = \frac{1}{6}</math>  an odd: <math>P(\text{odd}) = \frac{3}{6} = \frac{1}{2}</math>  a 2: <math>P(2) = \frac{1}{6}</math></p> <p><math>P(6 \ \&amp; \ \text{odd} \ \&amp; \ 2) = \left(\frac{1}{6}\right)\left(\frac{1}{2}\right)\left(\frac{1}{6}\right) = \frac{1}{72}</math></p> <p><math>0.0138 = \underline{0.014}</math>  <math>72 \overline{)1.0000}</math>  <math>\underline{01}</math>  <math>100</math>  <math>\underline{72}</math>  <math>280</math>  <math>\underline{216}</math>  <math>640</math></p> <p><math>(0.014)(100\%) = \underline{1.4\%}</math></p>	<p><b>EX</b> If you flip a coin five times, what is the probability that you will get heads every time?</p> <p><i>Every time means you’d get: Heads, heads, heads, heads &amp; heads... COMPOUND...Multiply!</i></p> <p>Probability of heads: <math>P(H) = \frac{1}{2}</math>  <math>P(HHHHH) = \left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)\left(\frac{1}{2}\right)</math>  <math>P(HHHHH) = \frac{1}{32}</math></p> <p><math>0.0312 = \underline{0.031}</math>  <math>32 \overline{)1.0000}</math>  <math>\underline{01}</math>  <math>100</math>  <math>\underline{96}</math>  <math>40</math>  <math>\underline{32}</math>  <math>80</math></p> <p><math>(0.031)(100\%) = \underline{3.1\%}</math></p>	<p><b>EX</b> If you choose two marbles at random from a bag containing 3 red, 2 yellow and 5 blue marbles, what is the probability that you will choose a red or a blue marble first, and a yellow marble second, if you put the first marble back into the bag?</p> <p><i>“And” means multiply!</i></p> <p>Probability of a red or blue: red or blue possibilities: 8, total: 10  <math>P(r \ \text{or} \ b) = \frac{8}{10} = \frac{4}{5}</math></p> <p>Probability of a yellow:  <math>P(y) = \frac{2}{10} = \frac{1}{5}</math></p> <p><math>P(r \ \text{or} \ b \ \&amp; \ y) = \left(\frac{4}{5}\right)\left(\frac{1}{5}\right) = \frac{4}{25}</math></p> <p><math>0.1600 = \underline{0.160}</math>  <math>25 \overline{)4.0000}</math>  <math>\underline{25}</math>  <math>150</math>  <math>\underline{150}</math>  <math>00</math>  <math>\underline{00}</math>  <math>00</math></p> <p><math>(0.160)(100\%) = \underline{16.0\%}</math></p>
<p>1. If a number cube (#1-6) is rolled 4 times, what is the probability of rolling a 5 and three 4s?</p>	<p>2. A fair spinner has 7 sections: 1A, 2B, 3C, 4D, 5E, 6F, and 7G. If you spin the spinner twice, what is the probability of spinning an even or a vowel (a, e, i, o, u) on the first spin and a 7 on the second?</p>	<p>3. When rolling a 6-sided number cube (#1-6) three times, what is the probability of rolling an odd number every time (odd &amp; odd &amp; odd)?</p>

<p>4. When rolling a 6-sided number cube (#1-6) twice, what is the probability of rolling a number that is not a 4 and a number that is even?</p>	<p>5. When spinning a fair spinner with four equal sections—black, blue, purple, and green—, what is the probability of landing on a blue, then a green, then either a black or a purple?</p>	<p>6. In a bag of marbles, there are 7 striped marbles, 2 solid marbles, and 1 swirled marble. What is the probability of randomly choosing a striped marble, putting it back in the bag (not changing the contents of the bag), and then choosing a solid marble?</p>
<p>7. When spinning a fair spinner that has 6 striped sections, 2 yellow sections and 2 blue sections, what is the probability of landing on a striped section, spinning again, and landing on the exact same section?</p>	<p>8. In a bag of marbles, there are 12 purple marbles, 10 black marbles, and 3 yellow marbles. What is the probability of choosing a black or purple marble, putting it back, and then randomly choosing the marble you chose the first time?</p>	<p>9. If a number cube (#1-6) is rolled 3 times, what is the probability of rolling a 6, a 2, and an 8?</p>
<p>10. In a deck of 52 cards, there are 4 Jacks. Two of the Jacks are black and two are red. What is the probability that a red Jack and a black jack will be chosen at random from the deck, assuming the first card is replaced (put back) in the deck?</p>	<p>11. In a deck of 52 cards, there are 12 face cards. Out of the 26 black cards in the deck, 6 of them are face cards. What is the probability that two cards chosen at random will be a black card and a red face card, assuming the first card is replaced (put back) in the deck?</p>	<p>12. In a deck of 52 cards, there are 36 number cards and four aces. If two card are chosen at random, what is the probability that one of them will not be a number card or an ace and the other will be an ace, assuming the first card is replaced (put back) in the deck?</p>