

$$P(A \text{ and } B) = P(A) \times P(B) \quad | \quad 15$$

Example 2: Sample space possible, multiplication rule more efficient

In an experiment, you flip a coin and roll a die. What is the probability that the coin lands heads and the die shows a 5?

Create the sample space for this experiment and answer the question. Then answer the question with the multiplication rule. Discuss differences in method – which one is “better”?

	1	2	3	4	5	6
H	H1	H2	H3	H4	H5	H6
T	T1	T2	T3	T4	T5	T6

$$P(H5) = \frac{1}{12}$$

$$P(H) = \frac{1}{2}$$

$$P(5) = \frac{1}{6}$$

$$P(H \text{ and } 5) = P(H) \times P(5) = \frac{1}{2} \times \frac{1}{6} = \frac{1}{12}$$

Example 3

A jar contains 7 red candies and 3 green candies. You select a candy at random, replace it, and then select a second candy at random. Calculate the probability both of the candies you select are red.

$$\frac{7}{10} \times \frac{7}{10} = \frac{49}{100}$$

Example 4: Probabilities given as opposed to ‘raw numbers’

The probability of a randomly selected Manitoban going to see the doctor when they turn 40 years old is 37%. The probability of a randomly selected Manitoban having a first name that starts with the letter ‘Q’ is 4%. What is the probability that a randomly selected 40-year old Manitoban has gone to see the doctor and has a name that starts with Q?

$$\frac{37}{100} \times \frac{4}{100} = \frac{148}{10000}$$