Example 1

When tossing a coin, there is an equal probability of rolling heads or rolling tails. Two coins are tossed

a) Does the sequence of the events matter in this experiment?

No. They are separate events. Tossing the coins together does not affect their probabilities.

b) Are the events dependent or independent? Explain how you know.

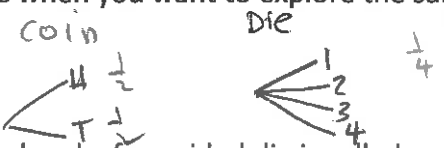
They are independent, because tossing the first coin (or first event) does not affect the probability of the second coin.

c) If two coins are tossed, calculate the probability that both are heads.

Using the formula $P(A \text{ and } B) = P(A) \times P(B)$

$P(H \text{ and } H) = P(\frac{1}{2}) \times P(\frac{1}{2}) = \frac{1}{4}$

A ***tree diagram*** can be helpful graphic organizer. In a tree diagram, the first set of outcomes are shown as a set of branches. For the second event, the branches "grow" from the ends of the first outcomes, representing all of the possible outcomes from the second 'selection' or 'trial'. A tree diagram helps when you want to explore the sample space of a more complex experiment.



Example 2

A coin is tossed and a four-sided die is rolled.

a) Create a tree diagram to determine the sample space for this experiment.

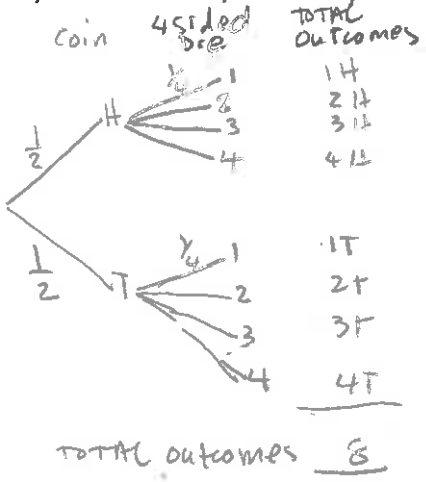
b) Create a table to show the sample space for this experiment.

c) Are the events of both trials (the coin toss and the die roll) dependent or independent? Justify your answer. Independent events

d) What is the probability of flipping heads and rolling a 4?

e) What is the probability of flipping heads or rolling a 4?

(a) tree digram



(b) CHART OR TABLE

	1	2	3	4
H	1H	2H	3H	4H
T	1T	2T	3T	4T

(c) They are independent events, because tossing the coin does not affect the outcome of the die.

d) $P(\text{Head and } 4) = \frac{1}{8} \rightarrow P(A \cap B) = P(A \text{ and } B) = P(A) \times P(B)$

$= \frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$

e) $P(\text{Heads or } 4) = \frac{5}{8} \rightarrow P(A \cup B) = P(A) + P(B) - P(A \cap B)$

$= \frac{1}{2} + \frac{1}{4} - \frac{1}{8}$

$= \frac{5}{8}$