

Stick Quiz

1. The following bills were put into a bag. What is the expected value you could win?

Outcome	Frequency
\$20	1/10 20/10
\$10	2/10 20/10
\$5	3/10 15/10
\$1	4/10 4/10

$$\frac{20}{10} + \frac{20}{10} + \frac{15}{10} + \frac{4}{10} = \frac{59}{10}$$

$$E(X) = \$5.90$$

2. A mysterious card-playing squirrel offers you the opportunity to join in his game. The rules are:

- To play you must pay him \$2.
- If you pick a **spade** you win \$9.
- If you pick a **heart** you win \$2.
- If you pick a **face card (King, Queen or Jack)** you win \$10.
- If you pick a **diamond or club** he wins \$5.

You can not win twice for face cards, they must not be included in the other categories. Find the expected value you win (or lose) per game. Would you play?

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Find the expected value you win (or lose) per game. Would you play?

	Outcome	Probability	(Rel Freq)
♠	\$9	10/52	90/52
♥	\$2	10/52	20/52
FC	\$10	12/52	120/52
♦♣	-\$5	20/52	-100/52
		$+ 52/52$	$130/52$
		$E(X) = 2.50$	

? ? ? ? ?
? Questions ?
? ? ? ? ?
? On ?
? ? ? ? ?
? Homework ?
? ? ? ? ?

Tree Diagrams

I can... use Tree and Venn diagrams to find probabilities.

Counting Outcomes & Tree Diagrams

What is the probability of flipping 3 heads in a row?



$$P(\text{HHH}) = \frac{1}{8}$$

Probability is 1/8!

What is the probability of flipping 1 head and 2 tails?

$$P(1\text{H and } 2\text{T}) = \frac{3}{8}$$



simple event: a single branch of a tree

compound event: a path, or sequence of simple events

Tap to show tree paths



Draw a tree diagram for a student that flipped a coin three times.

$$P(\text{H and H and H}) =$$

$$P(\text{at least one H}) =$$

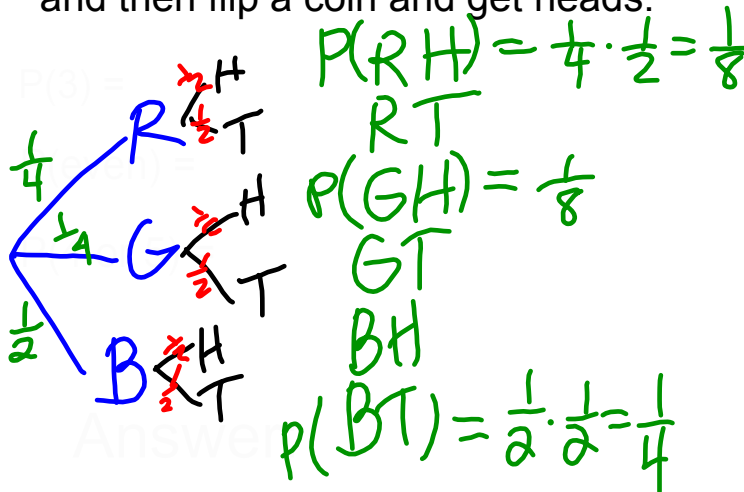
$$P(\text{H and H and T}) =$$

Probability of 2 heads and 1 tails in any order?

probability of a path: multiply the probability of each simple event to find the probability of a path

Example: You have a spinner with 1 part red, 1 part green and 2 parts blue (each part is equal). What is the chance you spin green and then flip a coin and get heads.

Tap to show



independent events: the occurrence of one has no influence on the occurrence of the other

Examples: P(6 on first roll) and P(6 on second roll)

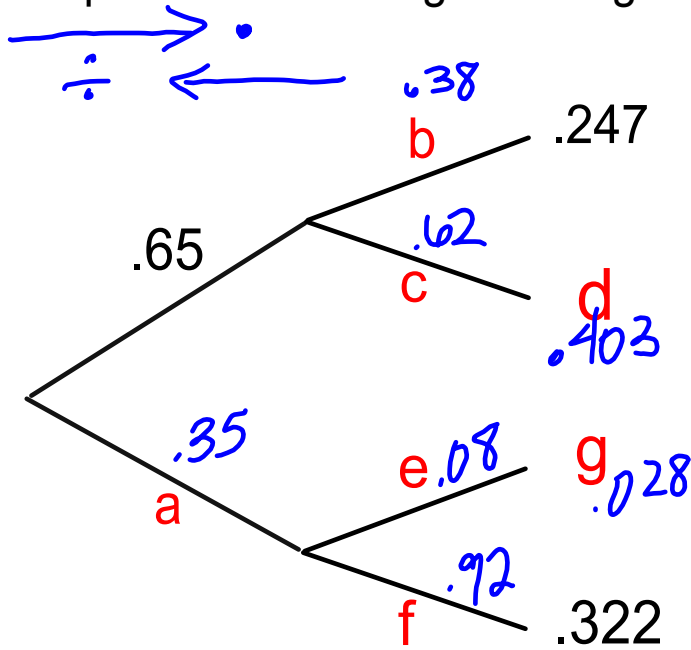
P(H on first toss) and P(T on second toss)

In other words, if two events are independent, then:

$$P(A \text{ and } B) = P(A) \cdot P(B)$$

$$P(A \text{ OR } B) = P(A) + P(B)$$

Complete the following tree diagram:



$$a = 1 - .65 = .35$$

$$b = .247 / .65 = .38$$

$$c = 1 - b = 1 - .38 = .62$$

$$d = .65 \times c = .65 \times .62 = .403$$

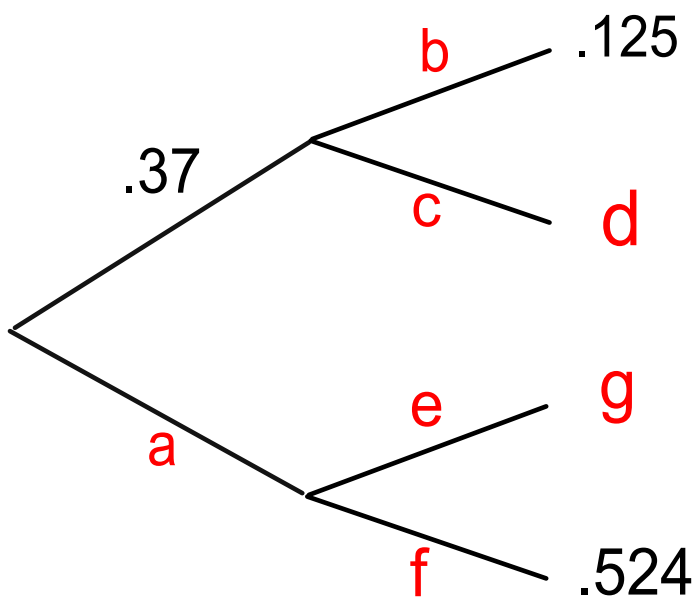
$$e = 1 - f = 1 - .92 = .08$$

$$f = .322 / a = .322 / .35 = .92$$

$$g = a \times e = .35 \times .08 = .028$$

Notice: $.247 + d + g + .322 = .247 + .403 + .028 + .322 = 1$

Fill in tree diagram.



You Try!

A spinner has 1 orange section and 4 pink sections (all equal). It is spun twice.

Draw a tree diagram.

a. What is the probability of getting orange twice?

b. What is the probability of not getting orange twice?

c. What is the probability of getting the same colour twice?

d. What is the probability of getting different colours?

