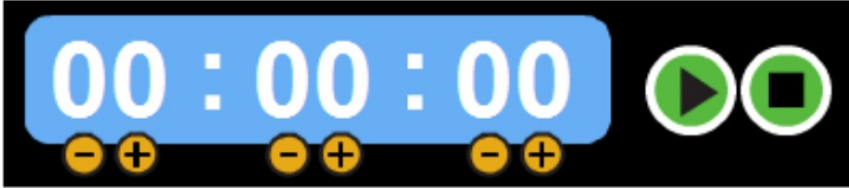


Timed Expectations



Create a frayer model for Expected Value

Definition:	Illustration:
Examples:	Non-Examples:

An oval is positioned in the center, overlapping the four quadrants of the Frayer Model.

up

If the probabilities that Ger and Tabatha will be valedictorian of a high school are $\frac{1}{5}$ and $\frac{1}{4}$ respectively, what is the probability that either Juan or Tabatha will be valedictorian?

A card is drawn from a standard deck of 52 cards, not replaced, and a second card is drawn. What is the probability that both cards are nines?

A quiz has 6 questions: 1 True-False question, 3 multiple choice questions with 3 choices and 2 multiple choice questions with 4 choices. If a student guesses at each of the questions, what is the expected number of questions answered correctly?

NOTATION

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

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

$$P(\text{B given A}) = P(B/A) = \frac{P(\text{A and B})}{P(A)}$$

The background is a dark purple gradient with several light purple circles of varying sizes. A small red rectangle is located in the top right corner.

1.7

Conditional Probability

Conditional Probability

$$P(B | A)$$

- ▶ The probability that event, B, will occur given that another event, A, has already happened.
- ▶ Exists when two events **depend** on each other.

1. Re-write each conditional probability into words:

- ▶ a. $P(\text{have short hair} \mid \text{the person is a boy})$

Probability person has short hair
given that person is a boy

- ▶ b. $P(\text{taking Spanish} \mid \text{senior})$

Prob. person taking Spanish given
that person is a senior

$\frac{P(A \text{ and } B)}{P(A)}$

Guitars			Total
	Acoustic	Electric	
Tan	78	42	120
Black	34	56	90
Blue	12	16	28
Total	124	114	238

1. $P(\text{black} | \text{acoustic})$

$$P(A \text{ and } B) = \frac{34}{238} = .14$$

$$P(A) = \frac{124}{238} = .52$$

3. $P(\text{blue} | \text{electric})$

$$P(\text{blue and electric}) = \frac{16}{238} = .067$$

$$P(\text{electric}) = \frac{114}{238} = .47$$

2. $P(\text{tan} | \text{electric})$

$$P(\text{tan and electric}) = \frac{42}{238}$$

$$P(\text{electric}) = \frac{114}{238} = .47$$

4. $P(\text{acoustic} | \text{tan})$

$$P(\text{acoustic and tan}) = \frac{78}{238}$$

$$P(\text{tan}) = \frac{120}{238} = .504$$

Students' Reading Preferences			
	Comic Books	Novels	Total
Middle School	128	32	160
High School	86	98	184
Total	214	130	344

5. What is the probability that a student prefers comic books, given that the student is in high school?

$$P(\text{comic and HS}) = \frac{86}{344} = .25$$

$$P(\text{HS}) = \frac{184}{344} = .53$$

$$P(\text{comic books} | \text{high}) = \frac{.25}{.53} = \boxed{.47}$$

irm-up

Education and Salary of Employees

	Under \$20,000	\$20,000 to \$30,000	Over \$30,000	Total
Less than high school	69	36	2	107
High school	112	98	14	224
Some college	102	193	143	438
College degree	13	173	245	431
Total	296	500	404	1240

Use the table to calculate the following:

$P(B \text{ given } A)$

1. $P(\text{earns over } \$30,000 \mid \text{only high school education})$

er
 $\frac{14}{2400} = .005$

only high S ~ $\frac{224}{2400} = .093$

$P(\text{has high school education or less} \mid \text{earns over } \$30,000)$

$\frac{16}{2400} = .007$

$\frac{404}{2400} = .168$

$\frac{.007}{.168} = .041$

$\frac{.05}{.05}$

. If two dice are thrown, what is the probability of getting a sum of

5.

- ▶ At Kennedy Middle School, the probability that a student takes Technology and Spanish is 0.087. The probability that a student takes Technology is 0.68. What is the probability that a student takes Spanish given that the student is taking Technology?



6.

A jar contains black and white marbles. Two marbles are chosen without replacement. The probability of selecting a black marble and then a white marble is 0.34, and the probability of selecting a black marble on the first draw is 0.47. What is the probability of selecting a white marble on the second draw, given that the first marble drawn was black?

7.

- ▶ The probability that it is Friday and that a student is absent is 0.03. Since there are 5 school days in a week, the probability that it is Friday is 0.2. What is the probability that a student is absent given that today is Friday?

8.

- ▶ If 39% of people in a community have a pet now and have had a pet in the past. 61% do not have a pet now. 86% have had a pet in the past and 14% do not have a pet now and have never had a pet in the past. What is the probability that a randomly selected person has a pet now, given that they have had a pet in the past?



9.

- ▶ In New York State, 48% of all teenagers own a skateboard and 39% of all teenagers own a skateboard and roller blades. What is the probability that a teenager owns roller blades given that the teenager owns a skateboard?



10.

- ▶ At a middle school, 18% of all students play football and basketball and 32% of all students play football. What is the probability that a student plays basketball given that the student plays football?

Assignment
Probability Assignment #7
(Handout)