

ALGEBRA 2H

Section 12.4: Using Addition With Probability

NOTES

I. The Probability of A or B

1. Let A and B represent events in the same sample space.

- (a) If A and B are **mutually exclusive**, meaning they do not have anything in common in the sample space, then the probability of A or B is

$$P(A \text{ or } B) = \underline{\hspace{10cm}}$$

Example: If you roll a standard die one time, what is the probability you roll a 3 or an even number?

- (b) If A and B are **inclusive**, meaning they do have something in common in the sample space, then the probability of A or B is

$$P(A \text{ or } B) = \underline{\hspace{10cm}}$$

Example: If you roll a standard die one time, what is the probability you roll a multiple of 3 or an even number?

2. Mixed Examples:

- (a) If you roll a standard die one time, what is the probability you roll a 2 or an odd number?

- (b) If you roll a standard die one time, what is the probability you roll a 2 or an even number?

3. Example: In a survey about a change in public policy, 100 people were asked if they favor the change, oppose the change, or have no opinion about the change. The responses are indicated in the table below.

	Men	Women	Total
Favor	18	9	27
Oppose	12	25	37
No Opinion	20	16	36
Total	50	50	100

- (a) Find the probability that a randomly selected respondent to the survey opposes or has no opinion about the change in policy.

- (b) Find the probability that a randomly selected respondent to the survey is a man or has opposes the change in policy.

- (c) Find the probability that a randomly selected respondent to the survey favors or has no opinion about the change in policy.

- (d) Find the probability that a randomly selected respondent to the survey is a woman or favors the change in policy.

4. Example: The table below shows all of the possible outcomes of rolling two number cubes (dice). Using the table, state whether the events in each pair are inclusive or mutually exclusive. Then find the probability of each pair of events.

(1, 1)	(1, 2)	(1, 3)	(1, 4)	(1, 5)	(1, 6)
(2, 1)	(2, 2)	(2, 3)	(2, 4)	(2, 5)	(2, 6)
(3, 1)	(3, 2)	(3, 3)	(3, 4)	(3, 5)	(3, 6)
(4, 1)	(4, 2)	(4, 3)	(4, 4)	(4, 5)	(4, 6)
(5, 1)	(5, 2)	(5, 3)	(5, 4)	(5, 5)	(5, 6)
(6, 1)	(6, 2)	(6, 3)	(6, 4)	(6, 5)	(6, 6)

How many
outcomes are
possible?

(a) a sum of 2 or a sum of 4 _____

(b) a sum of less than 3 or a sum of greater than 9 _____

(c) a sum of greater than 8 or a sum of greater than 10 _____

(d) a sum of greater than 4 or a sum of less than 7 _____

II. The Probability of the Complement of A

1. Definition: The **complement** of event A consists of all outcomes in the sample space that are _____ in A, and is denoted by _____.

2. Formulas: Let A represent an event in the sample space, then

(a) $P(A) + P(A^c) =$ _____

(b) $P(A) =$ _____

(c) $P(A^c) =$ _____

3. Examples:

(a) If you roll a standard die one time, what is the probability you roll a 2?

(b) If you roll a standard die one time, what is the probability you do not roll a 2?

(c) If you roll a standard die one time, what is the probability you do not roll a multiple of 3?

(d) If you draw one card from a standard deck of cards, what is the probability you do not draw a face card (jack, queen or king)?
