

Math 4 Success

FINDING THE PROBABILITY OF COMBINED EVENTS

LEVEL 23 Lesson 1

Finding the probability of combined events

- a) Mutually exclusive events are events that cannot both occur in one performance of an experiment.
- b) $P(E \cup F) = P(E) + P(F)$ if E and F are mutually exclusive events.
- c) $P(E \cup F) = P(E) + P(F) - P(E \cap F)$ if E and F are not mutually exclusive events.

Example: In Jerry's Boy Scout group of 24 scouts, 6 scouts are studying for the swimming merit badge and 10 scouts are studying for the life saving merit badge. Two scouts are studying for both merit badges. Find the probability that a scout is studying for:

1. Swimming merit badge
2. Life saving merit badge
3. Swimming and life saving merit badges
4. Swimming or life saving merit badge

Number of elements \longrightarrow

Scouts	E	F	$E \cup F$	P(E)	P(F)	$P(E \cap F)$	$P(E \cup F)$
24	6	10	2	1/4	5/12	1/12	2/3
	Swim	Life S.	Both	Swimming	Life Saving	Both	Either

FINDING THE PROBABILITY OF COMBINED EVENTS

1. CONCEPT:

Finding the probability of combined events

2. BEHAVIORAL OBJECTIVE:

The student given a sample space, two events, and their intersection will be able to find the probability of each event, their intersection and their union.

3. MATHEMATICAL IDEAS:

- a) Mutually exclusive events are events that cannot both occur in one performance of an experiment.
- b) $P(E \cup F) = P(E) + P(F)$ if E and F are mutually exclusive events.
- c) $P(E \cup F) = P(E) + P(F) - P(E \cap F)$ if E and F are not mutually exclusive events.

4. KEY WORDS:

mutually

exclusive

probability

FINDING THE PROBABILITY OF COMBINED EVENTS WORKSHEET

NAME _____

Fill in the blanks:

NUMBER OF ELEMENTS IN							
Sample Space	E	F	$E \cap F$	P(E)	P(F)	$P(E \cap F)$	$P(E \cup F)$
12	4	3	1				
15	3	5	0				
20	4	5	3				
18	6	3	2				
8	2	4	2				

In Mr. Johnson's math class of 36 students, 12 have green eyes, and 20 have black hair. Six students have both green eyes and black hair. Find the probability that a student has:

1. Green eyes:
2. Black hair:
3. Green eyes and black hair:
4. Green eyes or black hair:
5. Eyes any color but green:

FINDING THE PROBABILITY OF COMBINED EVENTS Answers to WORKSHEET

Fill in the blanks:

\ NUMBER OF ELEMENTS IN /							
Sample Space	E	F	$E \cap F$	P(E)	P(F)	$P(E \cap F)$	$P(E \cup F)$
12	4	3	1	$1/3$	$1/4$	$1/12$	$7/12$
15	3	5	0	$1/5$	$1/3$	0	$8/15$
20	4	5	3	$1/5$	$1/4$	$3/20$	$9/10$
18	6	3	2	$1/3$	$1/6$	$1/9$	$9/18$
8	2	4	2	$1/4$	$1/2$	$1/4$	$3/4$

In Mr. Johnson's math class of 36 students, 12 have green eyes, and 20 have black hair. Six students have both green eyes and black hair. Find the probability that a student has:

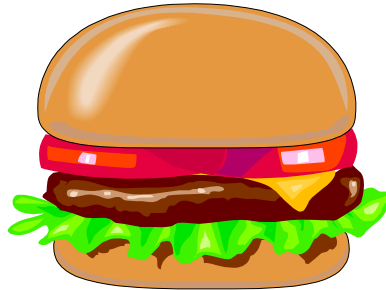
1. Green eyes: $1/3$
2. Black hair: $5/9$
3. Green eyes and black hair: $1/6$
4. Green eyes or black hair: $8/9$
5. Eyes any color but green: $2/3$

FINDING THE PROBABILITY OF COMBINED EVENTS CONCEPT TEST

NAME _____

Score _____

Cooky at the diner made 3 different kinds of hamburgers. He used only onions in 10, only cheese in 8, and both onions and cheese in 6. Find the probability that a hamburger contained:



1. only onions
2. only cheese
3. both onions and cheese
4. either onions or cheese, but not both
5. neither onions nor cheese

**FINDING THE PROBABILITY OF COMBINED
EVENTS
Answers to CONCEPT TEST**

1. $\frac{5}{12}$

2. $\frac{1}{3}$

3. $\frac{1}{4}$

4. $\frac{3}{4}$

5. 0