

## Eighth Grade Sample Lesson

# 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)  $P(E \cup F) = P(E)$  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 \_\_\_\_\_

Scouts	E	F	$2 \cup F$	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:

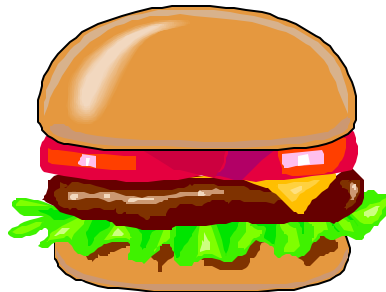
1. Green eyes:  $1/3$
2. Black hair:  $5/9$
3. Green eyes and black hair:  $1/6$
4. Green eyes or black hair:  $8/9$
5. Eyes any color but green:  $2/3$

## 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

# MATH 4 SUCCESS TABLE OF CONTENTS LEVEL 22

1. Naming Opposites of Rational Numbers (additive inverses) .....	3	
2. Simplifying Inequalities Involving the Symbols .....	7	
3. Adding and Subtracting Rational Numbers .....	12	
4. Multiplying Rational Numbers .....	17	
5. Dividing Rational Numbers .....	23	
6. Properties of Corresponding, Vertical, Alternate Exterior Alternate Interior, and Supplementary Angles .....	29	
7. Solving Equations by Inspection .....	36	
8. Determining Absolute Value .....	42	
9. Proving Triangles Congruent by ASA, SSS, SAS .....	47	
10. Translating Word Sentences into Number Sentences .....	54	
11. Specifying Sets using Set-Builder Notation .....	59	
12. Using Greatest Integer Notation .....	64	
13. Determining whether a given Set is closed for a specified operation.....	67	
14. Solving Equations using the Addition Property of Equality .....	70	
15. Pre-Test	Answers to Pre-Test .....	75
16. Post Test	Answers to Post Test.....	83
17. Class Record .....		94
18. Drill and Practice .....		91

# Math 4 Success

## TABLE OF CONTENTS

### LEVEL 23

1. Probability Combined Events .....	97
2. Multiplying powers of 10 with positive integral exponents .....	103
3. Dividing powers of 10 with positive integral exponents .....	108
4. Computing surface area, volume of prisms and pyramids.....	114
5. Solving Equations using the multiplication property of equality...	118
6. Extending the powers of 10 to include those with negative or zero integral exponents	124
7. Multiplying powers of 10 with integral exponents.....	129
8. Dividing powers of 10 with integral exponents .....	134
9. Geometry: Identifying parts of cones, cylinders and spheres.....	139
10. Using equations in one variable to solve word problems .....	146
11. Extending conversion within the metric system.....	151
12. Expressing rational numbers in scientific notation .....	154
13. Adding and Subtracting exponential expressions .....	157
14. Using Scientific Notation to simplify products .....	162
15. Using Truth Tables - Logic .....	165
16. Pre-Test      Answers to Pre-Test .....	170
17. Post Test      Answers to Post Test .....	179
18. Class Record .....	168
19. Drill and Practice .....	188

# Math 4 Success

## TABLE OF CONTENTS

### LEVEL 24

1. Using Unit Fractions of Exponents .....	192
2. Computing the surface Area of Cones, Cylinders, and Spheres .....	179
3. Solving Equations Involving Absolute Value .....	204
4. Identifying Significant Digits .....	209
5. Developing the set of real numbers .....	214
6. Comparing Real Numbers .....	223
7. Adding Real Numbers. Using Rational Approximations .....	228
8. Finding the Volume of Cones, Cylinder, and Spheres .....	223
9. Graphing Intervals of Real Numbers .....	239
10. Solving Inequality in one Variable .....	245
11. Converting to Metric Units of Volume .....	250
12. Reading Radical Expressions .....	255
13. Using Order to Estimate Square Roots .....	258
14. Calculating Square Root by the "Divide and Average" Method .....	261
15. Graphing Compound Inequalities .....	264
16. Solving Equations in Two Variables .....	267
17. Relating Probability to Statistics .....	270
18. Pre-Test Answers to Pre-Test .....	280
19. Post Test Answers to Post Test .....	292
20. Class Record .....	276
21. Drill and Practice .....	273

# Math 4 Success TABLE OF CONTENTS LEVEL 25

1. Using quantifiers (Logic) .....	305
2. Developing the property of density of the real numbers .....	310
3. Calculating square roots by the algorithm method .....	315
4. Solving right triangles .....	323
5. Graphing linear equations in two variables .....	329
6. Solving inequalities in two variables .....	334
7. Renaming metric units of capacity.....	339
8. Using tables to find rational approximations of positive square... roots	349
9. Graphing linear inequalities in two variables .....	355
10. Using arrangements, permutations, and combinations .....	360
11. Calculating square roots by the "sum of odd numbers" method .	364
12. Introducing Trigonometric Ratios.....	374
13. Graphing systems of linear equations in two variables .....	377
14. Pre-Test        Answers to Pre-Test.....	384
15. Post Test       Answers to Post Test.....	396
16. Class Record .....	383
17. Drill and Practice .....	380