LESSON MAKER PRO

Odds in Action

Use survey counts to find probabilities and make decisions.

HIGH SCHOOL · A1.D.2

A1.D.2 "Calculate probabilities, and apply probability concepts. Apply simple counting procedures (factorials, permutations, combinations, and tree diagrams) to determine sample size, sample space, and calculate probabilities..."

NAME _____ DATE _____

COUNT WITHOUT DOUBLING

When outcomes are equally likely, probability is the number of outcomes you want divided by the total number of outcomes. In a two-way table, AND points to one shared cell. OR includes either event or both, so count the shared cell only once. NOT means the event does not happen.

WORKED EXAMPLE

A student is chosen at random from this survey. What is the probability that the student bakes bread OR grows herbs?

AFTER-SCHOOL SURVEY

	Grows herbs	Does not grow herbs
Bakes bread	13	17
Does not bake bread	19	23

1. Count all students: 13 + 17 + 19 + 23 = 72.
2. Count each student who does either activity: 13 + 17 + 19 = 49.
3. Divide: P(bakes bread OR grows herbs) = 49/72.

Answer: 49/72

PRACTICE 6 problems

1 A student is chosen at random. What is P(art club AND part-time job)?

STUDENT ACTIVITIES

	Has a part-time job	No part-time job
In art club	12	10
Not in art club	14	16

ANSWER _____

2 A student is chosen at random. What is P(art club OR part-time job)?

STUDENT ACTIVITIES

	Has a part-time job	No part-time job
In art club	12	10
Not in art club	14	16

ANSWER _____

3 A student is chosen at random. What is P(NOT listening to music)?

LISTENING HABITS

	Listens to podcasts	Does not listen to podcasts
Listens to music	18	15
Does not listen to music	20	27

ANSWER _____

4 A student is chosen at random. What is P(listening to music OR podcasts)?

LISTENING HABITS

	Listens to podcasts	Does not listen to podcasts
Listens to music	18	15
Does not listen to music	20	27

ANSWER _____

5 A student is chosen at random. What is P(riding the bus AND NOT playing a sport)?

TRAVEL AND SPORTS

	Plays a sport	Does not play a sport
Rides the bus	24	21
Does not ride the bus	30	25

ANSWER _____

6 A student is chosen at random. Find P(riding the bus OR playing a sport) and P(NOT riding the bus). Which is greater?

TRAVEL AND SPORTS

	Plays a sport	Does not play a sport
Rides the bus	24	21
Does not ride the bus	30	25

ANSWER _____

APPLY IT Show your work

1 At a school movie night, 60 students answer a poll. Of those students, 28 want a comedy, 25 want an action movie, and 10 want both. If one student is chosen at random, what is P(comedy OR action)? Would a movie in either genre fit at least one preference for a majority of students?

WORK SPACE

ANSWER _____

2 An online merch shop tracks 40 orders. Of those orders, 22 include a sticker pack, 18 include a keychain, and 8 include both. If one order is chosen at random, what is P(neither item)? Should the shop plan for more orders with at least one item or with neither item?

WORK SPACE

ANSWER _____

CHALLENGE One step up

In a survey of 90 students, 50 use a school study app, 42 use digital flashcards, and 68 use at least one of them. If one student is chosen at random, find P(using both) and P(using neither). Show how AND, OR, and NOT connect to your calculations.

WORK SPACE AND ANSWER

Odds in Action

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A student is chosen at random. What is P(art club AND part-time job)?	**3/13**
2	A student is chosen at random. What is P(art club OR part-time job)?	**9/13**
3	A student is chosen at random. What is P(NOT listening to music)?	**47/80**
4	A student is chosen at random. What is P(listening to music OR podcasts)?	**53/80**
5	A student is chosen at random. What is P(riding the bus AND NOT playing a sport)?	**21/100**
6	A student is chosen at random. Find P(riding the bus OR playing a sport) and P(NOT riding the bus). Which is greater?	**P(bus OR sport) = 3/4; P(NOT bus) = 11/20. Bus OR sport is greater.**

PART 2 · APPLY IT

1. **43/60; yes, 43 of 60 students chose at least one of the genres.** Count the students who chose at least one genre: 28 + 25 - 10 = 43. Since 43 is more than half of 60, the answer to the majority question is yes.
2. **1/5; more orders have at least one item.** There are 22 + 18 - 8 = 32 orders with at least one item, leaving 40 - 32 = 8 with neither. Thus P(neither) = 8/40 = 1/5, and 32 is greater than 8.

CHALLENGE

Both: 50 + 42 - 68 = 24 students, so P(both) = 24/90 = 4/15. Neither: 90 - 68 = 22 students, so P(neither) = 22/90 = 11/45. Both means app AND flashcards; neither means NOT (app OR flashcards).

Accept equivalent fractions. For OR, students may add the three included table cells or add the two event totals and subtract the overlap.