

Compound Events

A **compound event** is an event made up of two or more simple events. We will learn about two different types of events in this packet.

Mutually Exclusive Events

These are events that cannot both occur in the same trial of an experiment.

For example, "rolling a 1" and "rolling a 2" on the same roll of a number dice are mutually exclusive events.

For two mutually exclusive events A and B: $P(A \text{ or } B) = P(A) + P(B)$

Example 1

A fast food restaurant puts one label on each of their drink cups: "free drink", "free fries", or "try again". A drink has a $\frac{1}{10}$ probability of being labeled "free drink" and a $\frac{1}{25}$ probability of being labeled "free fries".

- a) Explain why the events "free drink" and "free fries" are mutually exclusive.

Answer: Each drink cup only has one label applied to it.

- b) What is the probability that a bottle cap is labeled "free drink" or "free fries"?

Answer: $P(\text{free drink or free fries}) = P(\text{free drink}) + P(\text{free fries})$

$$= \frac{1}{10} + \frac{1}{25}$$
$$= \frac{5}{50} + \frac{2}{50} = \frac{7}{50}$$

Practice Problem #1

A bag contains 20 popsicles: 7 blue, 4 red, 5 green, and 4 yellow.

- a) Explain why the events "grabbing a red popsicle" and "grabbing a green popsicle" are mutually exclusive events.

You can only grab one popsicle at a time.

b) What is the probability of grabbing a blue popsicle or grabbing a green popsicle?

$$\frac{7}{20} + \frac{5}{20} = \frac{12}{20} = \boxed{\frac{3}{5}}$$

Inclusive Events

These are events that have one or more outcomes in common.

For example, "rolling an even number" and "rolling a prime number" are inclusive events because the number 2 is both prime and even.

For two inclusive events A and B: $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

Example 1

Find the probability of rolling a number dice and "rolling a 5" or "rolling an odd number".

$$P(5 \text{ or odd}) = P(5) + P(\text{odd}) - P(5 \text{ and odd})$$

$$= \frac{1}{6} + \frac{3}{6} - \frac{1}{6} \rightarrow = \frac{1}{2}$$

Explain why "rolling a 5" and "rolling an odd number" are inclusive events.

because 5 is an odd number

Practice Problem #1

At the local high school there are 48 teachers, 20 of which are male. Of the 20 male teachers 4 teach science. $\frac{1}{6}$ of all the teachers teach science. What is the probability that a teacher is a male or teaches science?

$$P(\text{male or teaches science}) = P(\overset{20}{\underset{\text{male}}{48}}) + P(\overset{\text{teaches}}{\underset{\text{science}}{8}}) - P(\overset{\text{male and}}{\underset{\text{teaches science}}{4}})$$

$$= \frac{20}{48} + \frac{8}{48} - \frac{4}{48} = \frac{24}{48} = \boxed{\frac{1}{2}}$$

Come show me your answer so I know you're on the right track!

Assignment: Practice B Worksheet + pg 822 #2-10, 12-18

LESSON
11-4

Practice B
Compound Events

A can of vegetables with no label has a $\frac{1}{8}$ chance of being green beans and a $\frac{1}{5}$ chance of being corn.

1. Explain why the events "green beans" or "corn" are mutually exclusive.

each can contains only one type of vegetable

2. What is the probability that an unlabeled can of vegetables is either green beans or corn? $\frac{1}{8} + \frac{1}{5} = \frac{5}{40} + \frac{8}{40} =$

$\frac{13}{40}$

Ben rolls a 1–6 number cube. Find each probability.

3. Ben rolls a 3 or a 4. $\frac{1}{6} + \frac{1}{6} = \frac{2}{6} =$

$\frac{1}{3}$

4. Ben rolls a number greater than 2 or an even number.

$\frac{5}{6}$

5. Ben rolls a prime number or an odd number.

$\frac{2}{3}$

Of the 400 doctors who attended a conference, 240 practiced family medicine and 130 were from countries outside the United States. One-third of the family medicine practitioners were not from the United States. (80)

6. What is the probability that a doctor practices family medicine or is from the United States? $\frac{240}{400} + \frac{270}{400} - \frac{160}{400} = \frac{350}{400}$

$= \frac{7}{8}$

7. What is the probability that a doctor practices family medicine or is not from the United States? $\frac{240}{400} + \frac{130}{400} - \frac{80}{400} = \frac{290}{400}$

$= \frac{29}{40}$

8. What is the probability that a doctor does not practice family medicine or is from the United States? $\frac{160}{400} + \frac{270}{400} - \frac{110}{400} = \frac{320}{400}$

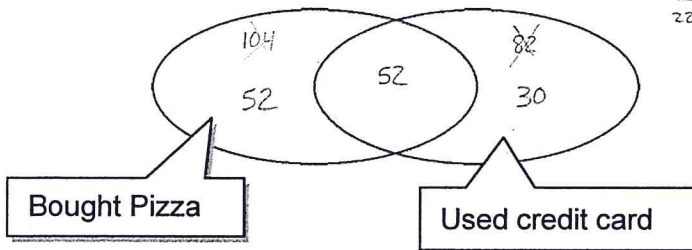
$= \frac{4}{5}$

Use the data to fill in the Venn diagram. Then solve.

9. Of the 220 people who came into the Italian deli on Friday, 104 bought pizza and 82 used a credit card. Half of the people who bought pizza used a credit card. What is the probability that a customer bought pizza or used a credit card?

$\frac{104}{220} + \frac{82}{220} - \frac{52}{220} = \frac{134}{220}$

≈ 0.61



Solve.

10. There are 6 people in a gardening club. Each gardener orders seeds from a list of 11 different types of seeds available. What is the probability that 2 gardeners will order the same type of seeds?

Mr. Ward Answer Key

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2. A marble cannot both be black and red.

$$3. \frac{13}{25} + \frac{2}{25} = \frac{15}{25} = \boxed{\frac{3}{5}}$$

4. Car cannot turn both left and right.

$$0.1 + 0.2 = \boxed{0.3}$$

$$5. \frac{5}{10} + \frac{5}{10} - \frac{2}{10} = \frac{8}{10} = \boxed{\frac{4}{5}}$$

$$6. \frac{1}{10} + \frac{4}{10} - \frac{9}{10} = \frac{5}{10} = \boxed{\frac{1}{2}}$$

$$7. \frac{5}{10} + \frac{5}{10} - \left(\frac{5}{10} \cdot \frac{4}{9}\right) = \frac{5}{10} + \frac{5}{10} - \frac{20}{90}$$
$$\frac{45}{90} + \frac{45}{90} - \frac{20}{90} = \frac{70}{90} = \boxed{\frac{7}{9}}$$

$$8. \frac{400}{650} + \frac{310}{650} - \frac{200}{650} = \frac{510}{650} = \boxed{\frac{51}{65}}$$

$$9. \frac{400}{650} + \frac{340}{650} - \frac{200}{650} = \frac{540}{650} = \boxed{\frac{54}{65}}$$

$$10. \frac{250}{650} + \frac{310}{650} - \frac{110}{650} = \frac{450}{650} = \boxed{\frac{9}{13}}$$

12. The jump rope is either red or green

$$13. \frac{1}{6} + \frac{1}{3} = \frac{1}{6} + \frac{2}{6} = \frac{3}{6} = \boxed{\frac{1}{2}}$$

$$14. \frac{1}{16} + \frac{1}{16} = \frac{2}{16} = \boxed{\frac{1}{8}}$$

$$15. \frac{1}{16} + \frac{3}{16} = \frac{4}{16} = \boxed{\frac{1}{4}}$$

$$16. \frac{42}{98} + \frac{14}{98} - \frac{8}{98} = \frac{48}{98} = \boxed{\frac{24}{49}}$$

$$17. \frac{56}{98} + \frac{14}{98} - \frac{6}{98} = \frac{64}{98} = \boxed{\frac{32}{49}}$$

$$18. \frac{56}{98} + \frac{84}{98} - \frac{50}{98} = \frac{90}{98} = \boxed{\frac{45}{49}}$$