LESSON MAKER PRO

Event Set Detective

Use sets to describe outcomes and event relationships.

HIGH SCHOOL · MA.912.DP.4.1

MA.912.DP.4.1 "Describe events as subsets of a sample space using characteristics, or categories, of the outcomes, or as unions, intersections or complements of other events."

NAME _____ DATE _____

BUILD THE EVENT

An event is any group of outcomes in the sample space. Use A∪B for outcomes in A or B, A∩B for outcomes in both, and A' for outcomes in S that are not in A. List each outcome only once.

WORKED EXAMPLE

Let S={oak, pine, maple, birch}, A={oak, maple}, and B={maple, birch}. Find A∩B.

1. An intersection contains outcomes that are in both sets.
2. maple is the only outcome listed in both A and B.

Answer: A∩B={maple}

PRACTICE 6 problems

1 Let S={1,2,3,4,5,6,7,8,9,10,11,12}. Write the event E for selecting an outcome divisible by 4.

ANSWER _____

2 A music app can select one genre from S={drama, jazz, pop, rock, rap, classical}. Write the event G for selecting jazz or rap.

ANSWER _____

3 Let S={2,3,4,5,6,7,8,9,10}. Let A be the even outcomes, and let B be the factors of 18. List A∩B.

ANSWER _____

4 Let S={1,2,3,4,5,6,7,8,9,10}. Let P be the prime outcomes, and let H be the outcomes greater than 7. List P∪H.

ANSWER _____

5 Let S={a,b,c,d,e,f,g} and V={a,e}. List V'.

ANSWER _____

6 Let S={0,1,2,3,4,5,6,7,8,9}, A={0,2,4,6,8}, and B={0,3,6,9}. List A'∪B.

ANSWER _____

APPLY IT Show your work

1 At a concert fundraiser, one raffle ticket numbered 21 through 32 is selected. Let E be the event that the ticket number is even, and let F be the event that the ticket number is a multiple of 5. A ticket wins a meet-and-greet if it is in E∪F. List the winning ticket numbers.

WORK SPACE

ANSWER _____

2 At a student film festival, one volunteer is selected from S={Avery, Blake, Cameron, Devon, Ellis, Finley, Gray, Harper}. Let M={Avery, Cameron, Ellis, Harper} be the music crew, and let V={Blake, Cameron, Devon, Harper} be the video crew. Describe the event that the volunteer is on neither crew, then list its outcomes.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Let S={1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20}. Let A be the multiples of 2, B be the multiples of 3, and C be the multiples of 5. An outcome must be in exactly one of A and B, and it cannot be in C. Write an expression for this event and list its outcomes.

WORK SPACE AND ANSWER

ANSWER KEY

Event Set Detective

HIGH SCHOOL · MA.912.DP.4.1

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Let S={1,2,3,4,5,6,7,8,9,10,11,12}. Write the event E for selecting an outcome divisible by 4.	**E={4,8,12}**
2	A music app can select one genre from S={drama, jazz, pop, rock, rap, classical}. Write the event G for selecting jazz or rap.	**G={jazz, rap}**
3	Let S={2,3,4,5,6,7,8,9,10}. Let A be the even outcomes, and let B be the factors of 18. List A∩B.	**A∩B={2,6}**
4	Let S={1,2,3,4,5,6,7,8,9,10}. Let P be the prime outcomes, and let H be the outcomes greater than 7. List P∪H.	**P∪H={2,3,5,7,8,9,10}**
5	Let S={a,b,c,d,e,f,g} and V={a,e}. List V'.	**V'={b,c,d,f,g}**
6	Let S={0,1,2,3,4,5,6,7,8,9}, A={0,2,4,6,8}, and B={0,3,6,9}. List A'∪B.	**A'∪B={0,1,3,5,6,7,9}**

PART 2 · APPLY IT

1. **E∪F={22,24,25,26,28,30,32}** List the even ticket numbers and the multiples of 5. Combine the lists, writing 30 only once.
2. **(M∪V)'={Finley, Gray}** First find everyone in M∪V. The volunteers left in S are Finley and Gray.

CHALLENGE

(A∩B'∩C')∪(A'∩B∩C')={2,3,4,8,9,14,16}

Accept equivalent set notation and outcomes in any order. For the challenge, accept any equivalent expression that selects outcomes in exactly one of A and B and excludes C.