

Event Set Lab

Build events with or, and, and not.

HIGH SCHOOL • HSS-CP.A.1

CCSS.Math.Content.HSS-CP.A.1 "Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not")."

NAME _____

DATE _____

BUILD AN EVENT

Every event is a subset of the sample space, so list only outcomes that can happen. Use union for "or," intersection for "and," and a complement for "not"; "or" includes outcomes that are in both events.

WORKED EXAMPLE

A spinner has sample space $S = \{\text{circle, square, star, triangle}\}$. Let $A = \{\text{circle, star}\}$ and $B = \{\text{star, triangle}\}$. Find A and B .

1. $A = \{\text{circle, star}\}$.
2. $B = \{\text{star, triangle}\}$.
3. The only outcome in both sets is star.

Answer: $A \cap B = \{\text{star}\}$

PRACTICE 6 problems

- 1** A number cube has sample space $S = \{1, 2, 3, 4, 5, 6\}$. Write the event E that the outcome is greater than 3.

ANSWER _____

- 2** Let $S = \{a, b, c, d, e, f\}$, $A = \{a, c, e\}$, and $B = \{b, c, d\}$. Find A or B .

ANSWER _____

- 3** Let $S = \{10, 11, 12, 13, 14, 15\}$, $A = \{11, 13, 15\}$, and $B = \{13, 14, 15\}$. Find A and B .

ANSWER _____

- 4** Let $S = \{p, q, r, s, t, u\}$ and $D = \{q, s, u\}$. Write the event not D .

ANSWER _____

- 5** Let $S = \{1, 2, 3, 4, 5, 6, 7, 8, 9\}$, $P = \{3, 6, 9\}$, and $Q = \{2, 3, 5, 7\}$. Write the event "in P but not in Q " using set notation, then list its outcomes.

ANSWER _____

- 6** Let $S = \{w, x, y, z\}$, $C = \{w, x\}$, and $D = \{x, z\}$. Find the event "not in C or in D ."

ANSWER _____

APPLY IT Show your work

1

Student council will randomly choose one applicant from $S=\{\text{Ava, Ben, Carlos, Eli, Farah, Grace, Hana, Jay}\}$. The applicants who play a school sport are $A=\{\text{Ava, Carlos, Eli, Grace}\}$. The applicants in theater are $T=\{\text{Ben, Carlos, Farah, Grace}\}$. Write the event that the chosen applicant plays a school sport or is in theater.

WORK SPACE

ANSWER _____

2

A gaming club will randomly select one game from $S=\{\text{Nova, Pixel, Quest, Rally, Summit, Tempo}\}$. Strategy games are $R=\{\text{Nova, Quest, Summit}\}$, and multiplayer games are $M=\{\text{Pixel, Quest, Rally}\}$. Write the event that the selected game is neither a strategy game nor a multiplayer game.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Let $S=\{1,2,3,4,5,6,7,8,9,10,11,12\}$, $A=\{2,4,6,8,10,12\}$, and $B=\{2,3,5,7,11\}$. An outcome passes a filter only if it is not in A and not in B. Write the event using A and B, list its outcomes, and explain why.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A number cube has sample space $S=\{1,2,3,4,5,6\}$. Write the event E that the outcome is greater than 3.	$E=\{4,5,6\}$
2	Let $S=\{a,b,c,d,e,f\}$, $A=\{a,c,e\}$, and $B=\{b,c,d\}$. Find A or B .	$A \cup B=\{a,b,c,d,e\}$
3	Let $S=\{10,11,12,13,14,15\}$, $A=\{11,13,15\}$, and $B=\{13,14,15\}$. Find A and B .	$A \cap B=\{13,15\}$
4	Let $S=\{p,q,r,s,t,u\}$ and $D=\{q,s,u\}$. Write the event not D .	$D^c=\{p,r,t\}$
5	Let $S=\{1,2,3,4,5,6,7,8,9\}$, $P=\{3,6,9\}$, and $Q=\{2,3,5,7\}$. Write the event "in P but not in Q " using set notation, then list its outcomes.	$P \cap Q^c=\{6,9\}$
6	Let $S=\{w,x,y,z\}$, $C=\{w,x\}$, and $D=\{x,z\}$. Find the event "not in C or in D ."	$C^c \cup D=\{x,y,z\}$

PART 2 • APPLY IT

1. $A \cup T=\{\text{Ava, Ben, Carlos, Eli, Farah, Grace}\}$ Take every applicant in A or T . Carlos and Grace are listed once because they belong to both events.
2. $R^c \cap M^c=\{\text{Tempo}\}$ First find the games in R or M , then remove them from S . The only game outside both sets is Tempo.

CHALLENGE

$A^c \cap B^c=(A \cup B)^c=\{1,9\}$. An outcome must be outside both A and B , so remove every outcome in either set from S .

Accept set elements in any order. Accept equivalent notation such as "not A " for A^c and $(A \cup B)^c$ for $A^c \cap B^c$.