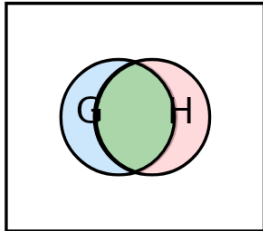




Probability - Set Operations - Examples

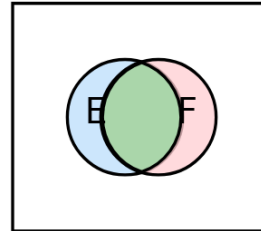
- 1 Based on this Venn diagram, are events G and H independent?



A No

B Yes

- 2 Based on this Venn diagram, which statement best describes events E and F?



A Neither mutually exclusive nor independent

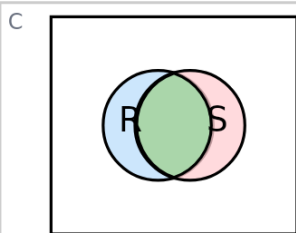
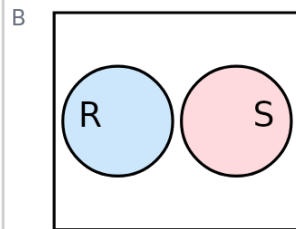
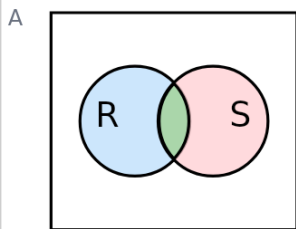
B Independent, but not mutually exclusive

C Mutually exclusive, but not independent

D Both mutually exclusive and independent

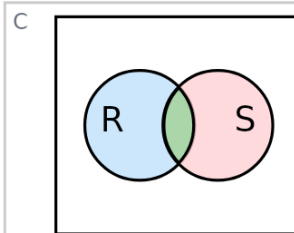
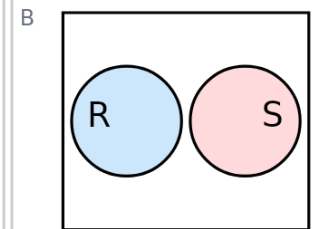
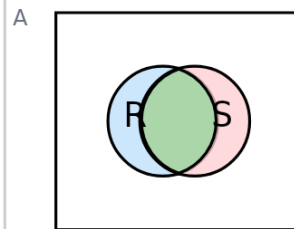
- 3 Which Venn diagram represents this situation?

Events R and S are mutually exclusive.

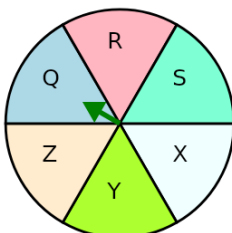


- 4 Which Venn diagram represents this situation?

Events R and S are not mutually exclusive but independent.



- 5 What set operation would give you the probability of not spinning 'Q'?



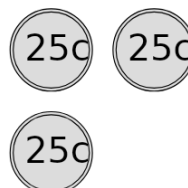
A Complement of (Q)

B (Q) union (Q)

C (Q) intersect (Q)

D (Q) conditional on (Q)

- 6 What set operation would give you the probability of flipping at least one heads in 3 tries?



A (All Tails) conditional on (All Tails)

B Complement of (All Tails)

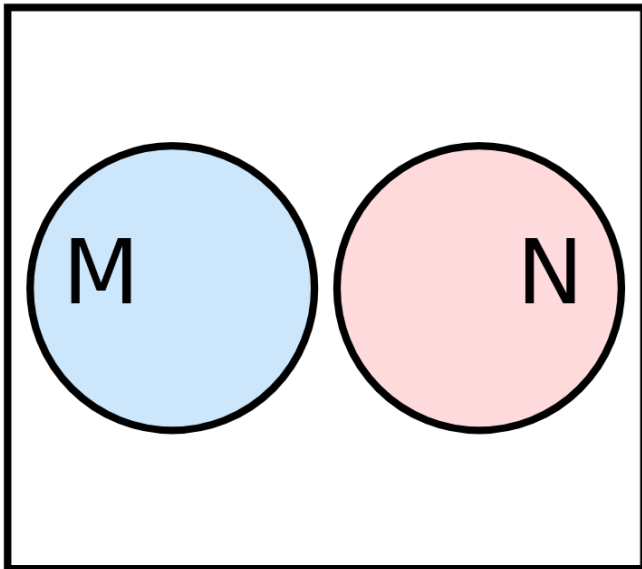
C (All Tails) intersect (All Tails)

D (All Tails) union (All Tails)



Probability - Set Operations - Examples

- 7 Events M and N are mutually exclusive. Which equation gives the probability that both M and N occur?

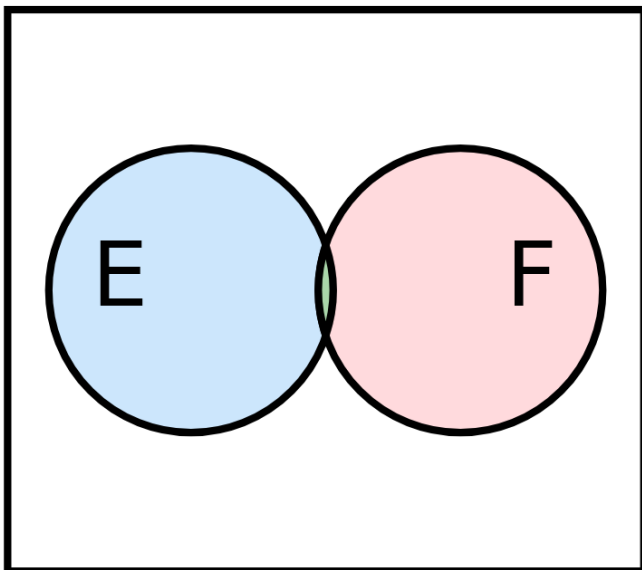


A Cannot be determined without more information

B
$$P(M \cap N) = 0$$

C
$$P(M \cap N) = P(M) \cdot P(N)$$

- 8 Events E and F are not mutually exclusive and not independent. Which equation gives the probability that E or F occurs?



A
$$P(E \cup F) = P(E) + P(F)$$

B
$$P(E \cup F) = P(E) + P(F) - P(E \cap F)$$

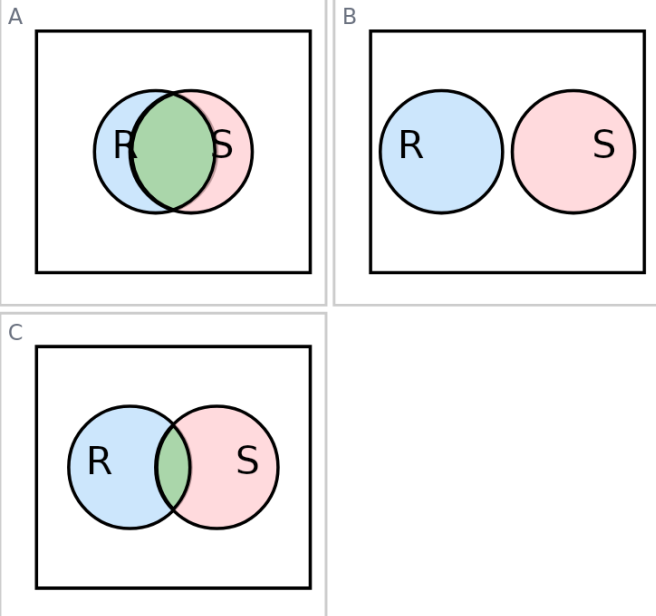
C
$$P(E \cup F) = P(E) + P(F) - P(E) \cdot P(F)$$



Probability - Set Operations - Examples

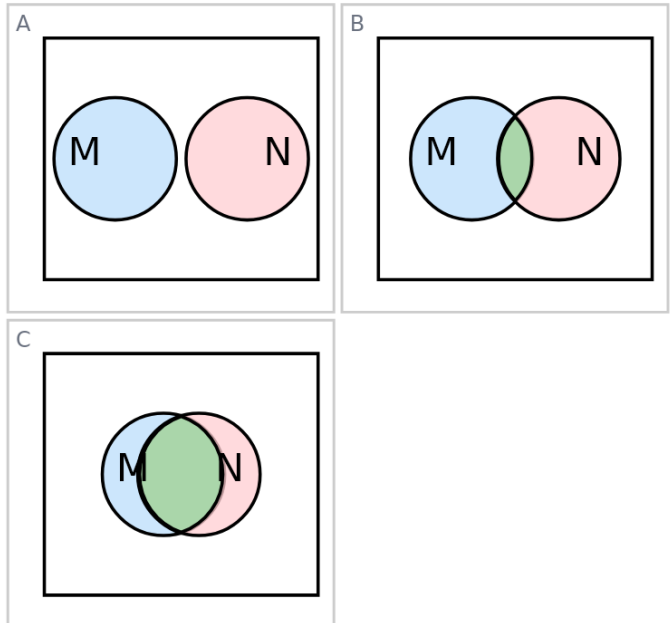
- 9 Which Venn diagram matches this information?

$$P(R \cap S) \neq P(R) \cdot P(S)$$

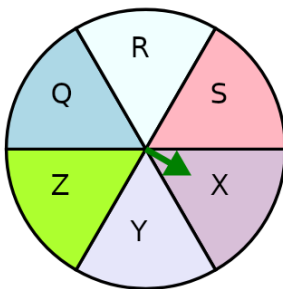


- 10 Which Venn diagram matches this information?

$$P(M \cup N) \neq P(M) + P(N) - P(M) \cdot P(N)$$

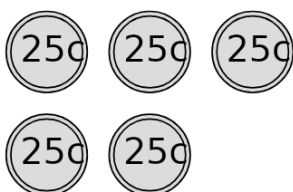


- 11 What set operation would give you the probability of spinning 'X' at least once given two tries?



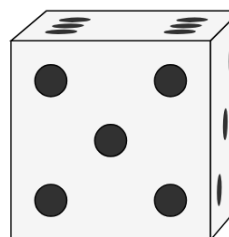
- A X_1 union X_2
- B X_1 conditional on X_2

- 12 What set operation would give you the probability of flipping at least one heads in 5 tries?



- A Complement of (All Tails)
- B (All Tails) conditional on (All Tails)
- C (All Tails) union (All Tails)
- D (All Tails) intersect (All Tails)

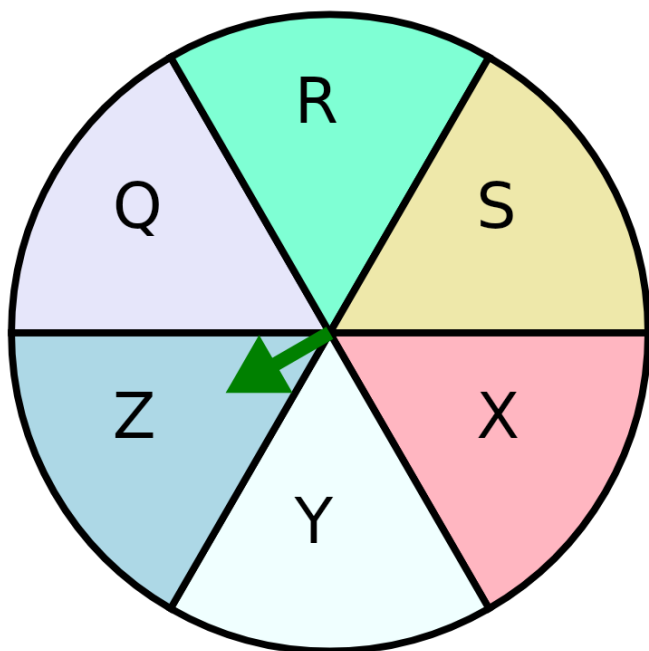
- 13 What set operation would give you the probability of not rolling a 5?



- A Complement of (5)
- B (5) intersect (5)
- C (5) union (5)
- D (5) conditional on (5)

**Probability - Set Operations - Examples**

14 What set operation would give you the probability of spinning 'Z' twice in a row?



A

$$P(Z_1|Z_2)$$

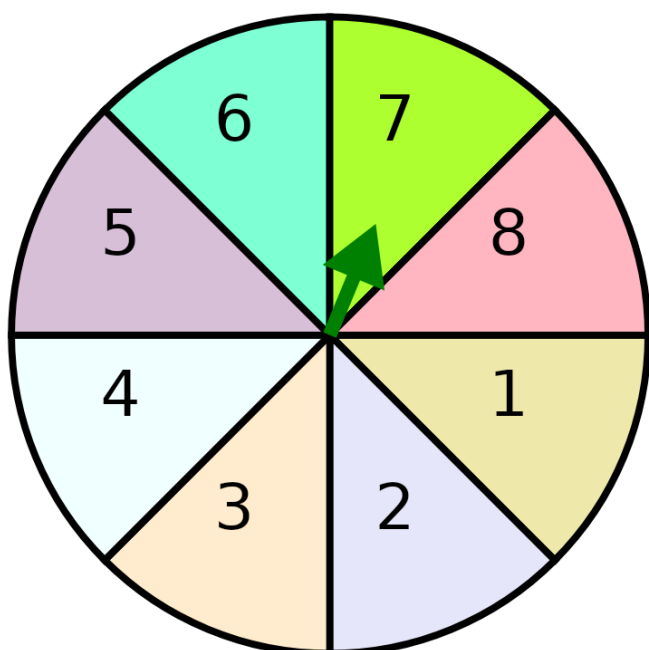
B

$$P(Z_1')$$

C

$$P(Z_1 \cap Z_2)$$

15 What set operation would give you the probability of landing on an odd number, given that the spinner landed on a number greater than 5?



A

$$P(\text{odd} | > 5)$$

B

$$P(> 5 | \text{odd})$$

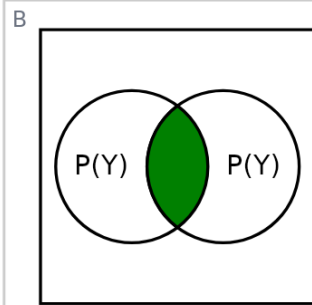
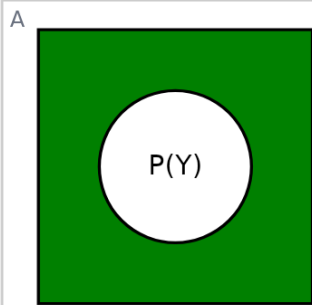
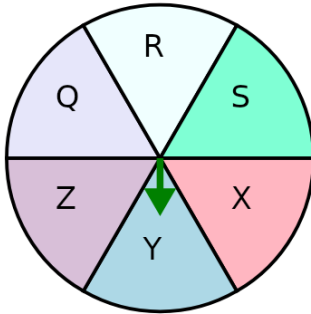
C

$$P(\text{odd}')$$

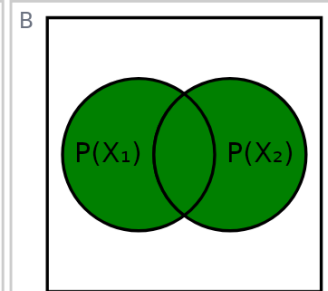
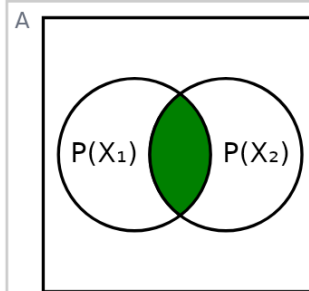
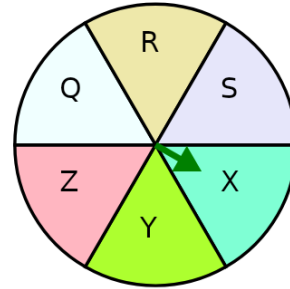


Probability - Set Operations - Examples

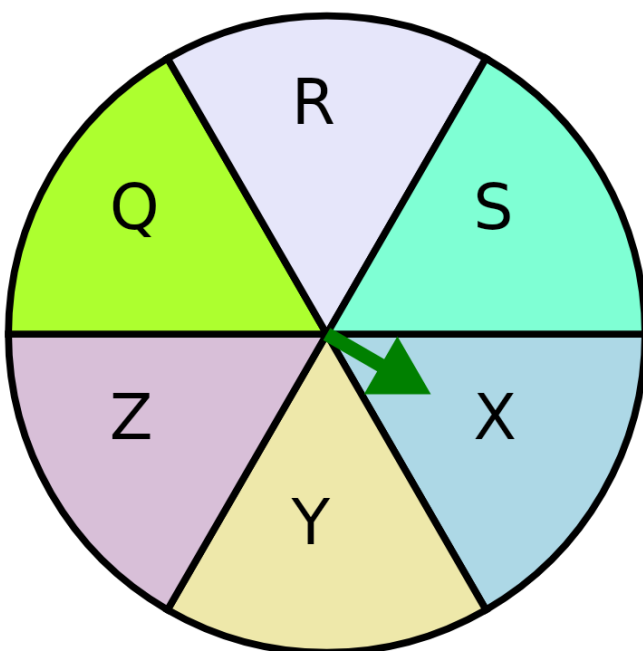
16 Which Venn diagram represents the probability of not spinning 'Y'?



17 Which Venn diagram represents the probability of spinning 'X' at least once given two tries?



18 What formula would give you the chance of spinning 'X' twice in a row?



A

$$\frac{P(X_1 \cap X_2)}{P(X_2)}$$

B

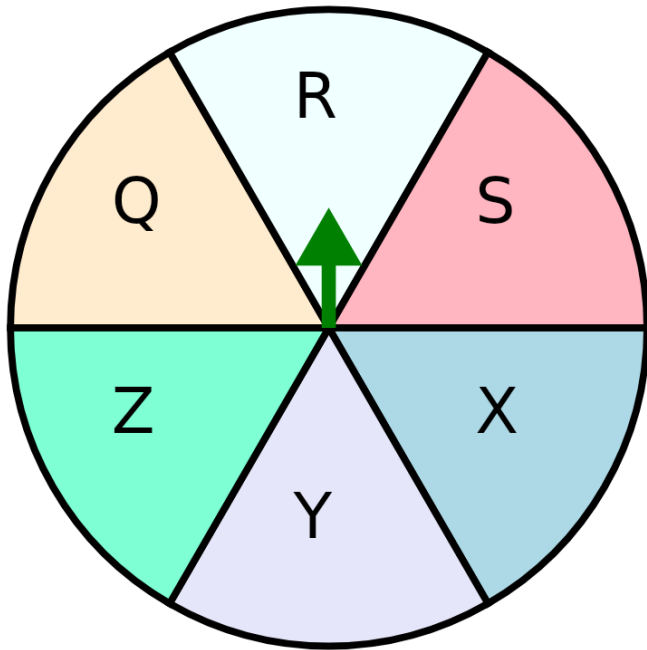
$$P(X_1) + P(X_2) - P(X_1 \cap X_2)$$

C

$$P(X_1) \cdot P(X_2)$$

**Probability - Set Operations - Examples**

19 What formula would give you the chance of spinning 'R' twice in a row?



A

$$P(R_1) \cdot P(R_2)$$

B

$$P(R_1) + P(R_2) - P(R_1 \cap R_2)$$

C

$$\frac{P(R_1 \cap R_2)}{P(R_2)}$$

20 What set operation would give you the probability of flipping tails twice in a row?



A

$$P(T_1 \cap T_2)$$

B

$$P(T_1 \cup T_2)$$

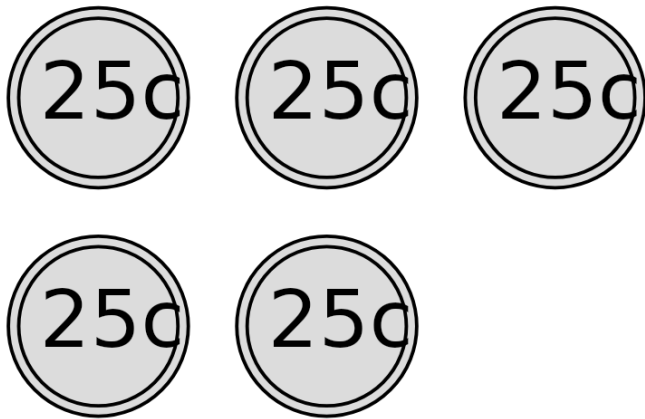
C

$$P(T_1')$$



Probability - Set Operations - Examples

21 What set operation would give you the probability of flipping at least one heads in 5 tries?



A

$$P(\text{All Tails} \cap \text{All Tails})$$

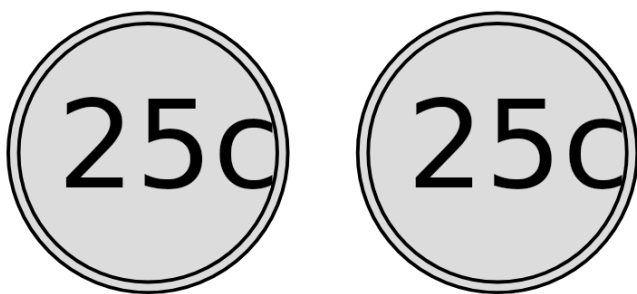
B

$$P(\text{All Tails}')$$

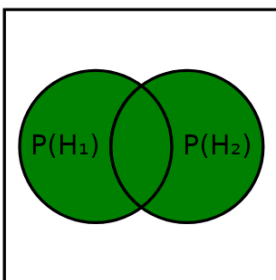
C

$$P(\text{All Tails} \cup \text{All Tails})$$

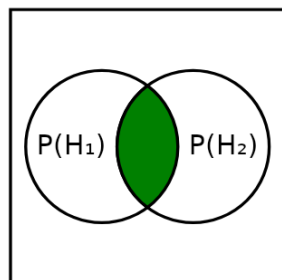
22 Which Venn diagram represents the probability of flipping heads twice in a row?



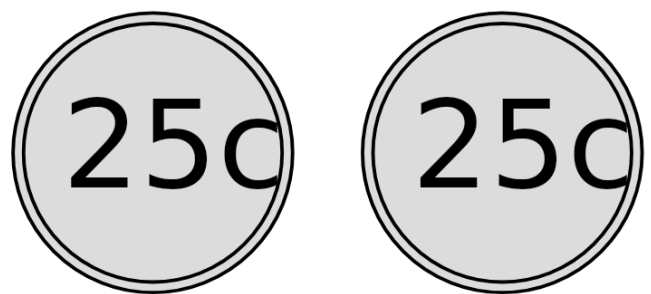
A



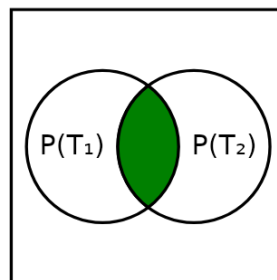
B



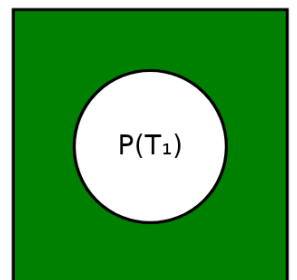
23 Which Venn diagram represents the probability of flipping tails twice in a row?



A



B



**Probability - Set Operations - Examples**

24 What formula would give you the chance of flipping at least one heads in 3 tries?



A $P(\text{All Tails}) + P(\text{All Tails}) - P(\text{All Tails} \cap \text{All Tails})$

B $1 - P(\text{All Tails})$

25 What formula would give you the chance of flipping heads twice in a row?



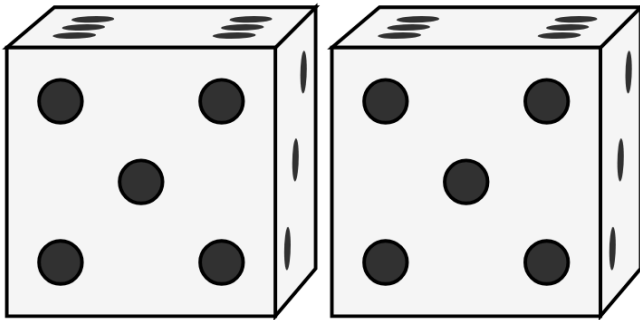
A $P(H_1) + P(H_2) - P(H_1 \cap H_2)$

B $P(H_1) \cdot P(H_2)$

C $\frac{P(H_1 \cap H_2)}{P(H_2)}$

**Probability - Set Operations - Examples**

26 What set operation would give you the probability of rolling a 5 at least once given two tries?



A

Complement of 5_1

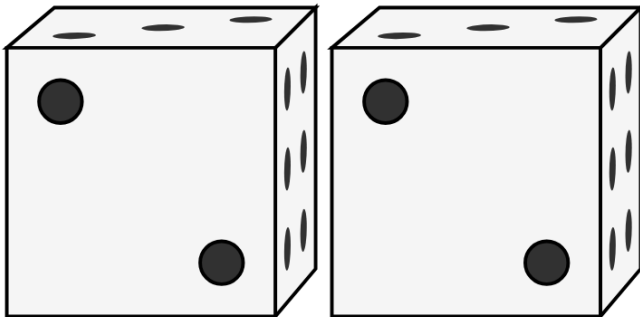
B

 5_1 union 5_2

C

 5_1 intersect 5_2

27 What set operation would give you the probability of rolling a 2 twice in a row?



A

 $P(2_1')$

B

 $P(2_1 \cup 2_2)$

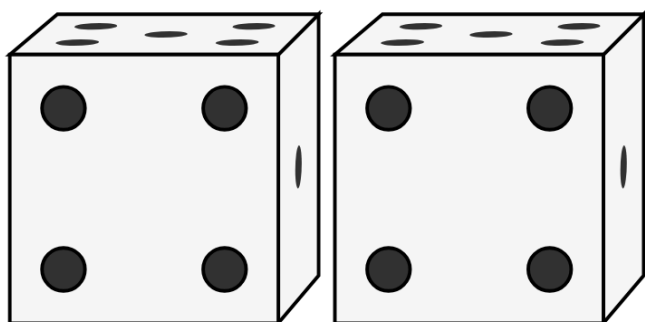
C

 $P(2_1 \cap 2_2)$



Probability - Set Operations - Examples

28 What set operation would give you the probability of rolling a 4 twice in a row?



A

$$P(4_1')$$

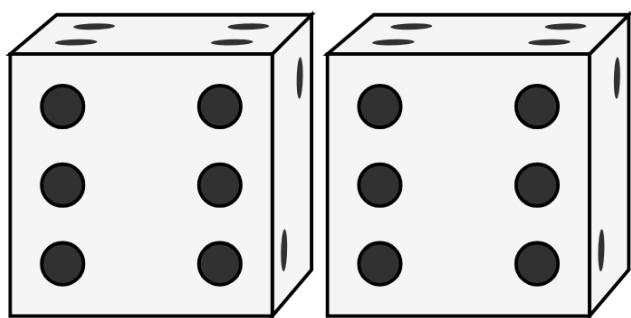
B

$$P(4_1|4_2)$$

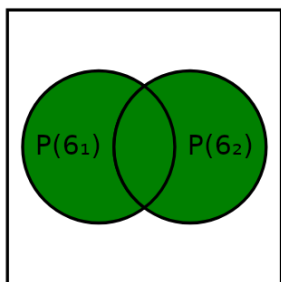
C

$$P(4_1 \cap 4_2)$$

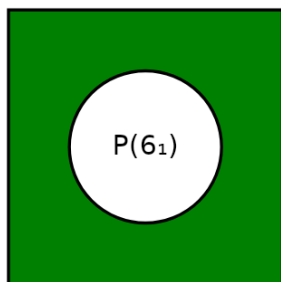
29 Which Venn diagram represents the probability of rolling a 6 at least once given two tries?



A



B



30 What set operation would give you the probability of drawing a card that is both a heart and even?

6 ♥	2 ♥
4 ♥	10 ♥

A Complement of (hearts)

B (hearts) conditional on (even)

C (hearts) intersect (even)

D (hearts) union (even)

31 What set operation would give you the probability of drawing a card that is even or over 6?

2 ♦	K ♥
Q ♠	A ♠

A (even) conditional on (over 6)

B Complement of (even)

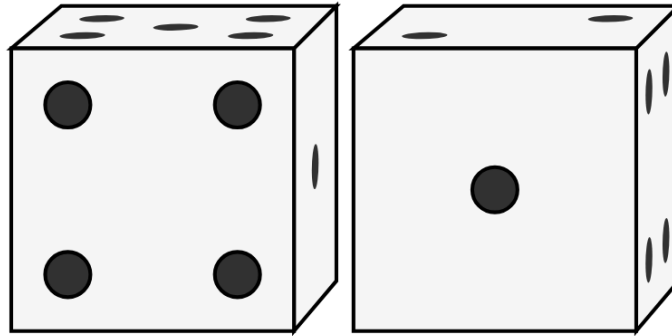
C (even) union (over 6)

D (even) intersect (over 6)

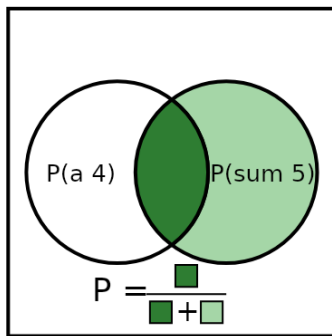


Probability - Set Operations - Examples

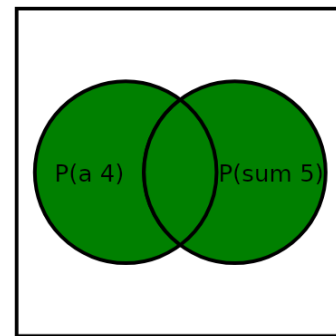
32 Which Venn diagram represents the probability of one die showing a 4, given that the sum is 5?



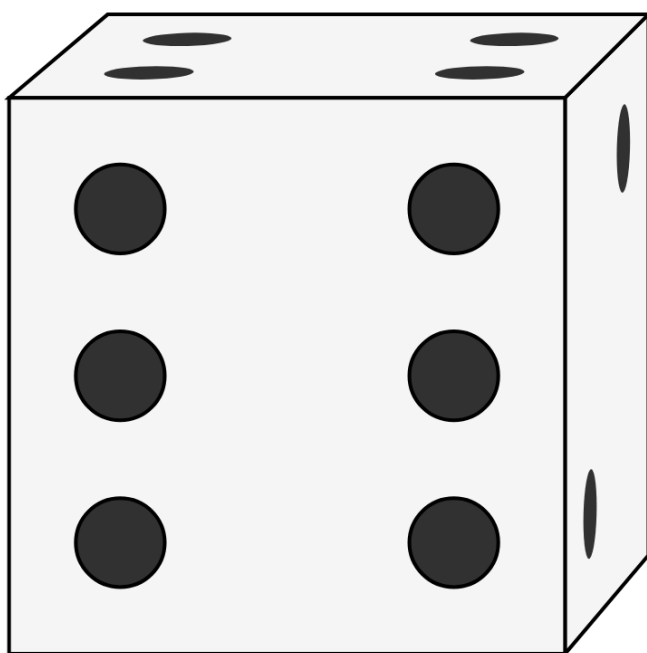
A



B



33 What formula would give you the chance of not rolling a 6?



A

$$1 - P(6)$$

B

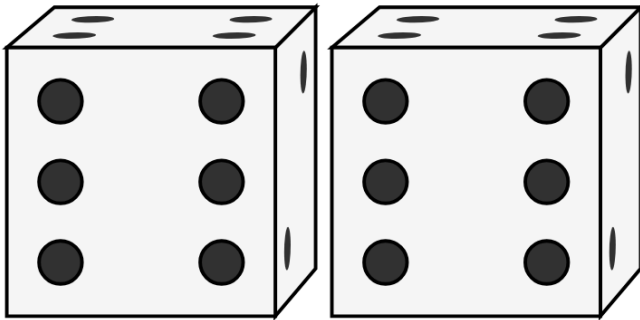
$$P(6) \cdot P(6)$$

C

$$\frac{P(6 \cap 6)}{P(6)}$$

**Probability - Set Operations - Examples**

34 What formula would give you the chance of rolling a 6 twice in a row?



A

$$1 - P(6_1)$$

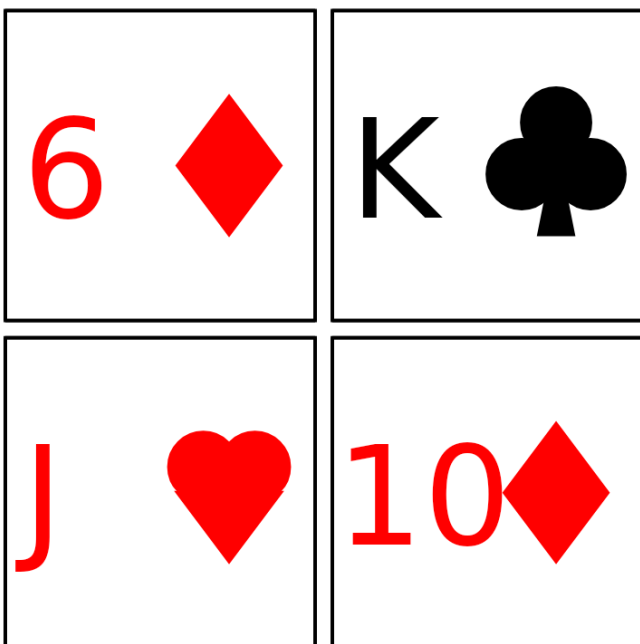
B

$$\frac{P(6_1 \cap 6_2)}{P(6_2)}$$

C

$$P(6_1) \cdot P(6_2)$$

35 What set operation would give you the probability of not drawing a card that is over 4?



A

$$P(\text{over } 4 \cup \text{over } 4)$$

B

$$P(\text{over } 4')$$

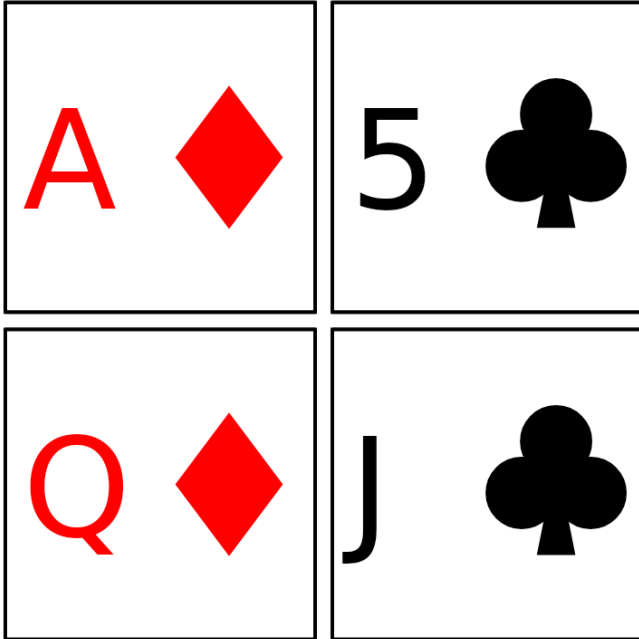
C

$$P(\text{over } 4 | \text{over } 4)$$



Probability - Set Operations - Examples

36 What set operation would give you the probability of drawing a card that is a club or over 8?



A

$$P(\text{clubs} \cup \text{over } 8)$$

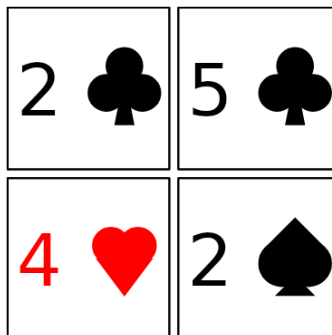
B

$$P(\text{clubs} | \text{over } 8)$$

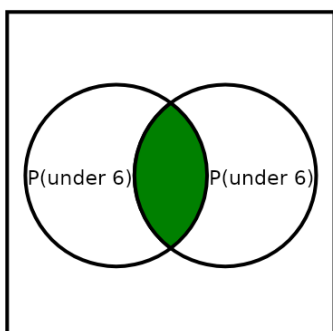
C

$$P(\text{clubs}')$$

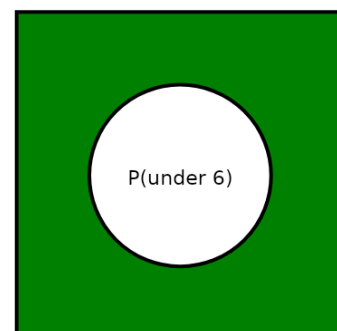
37 Which Venn diagram represents the probability of not drawing a card that is under 6?



A



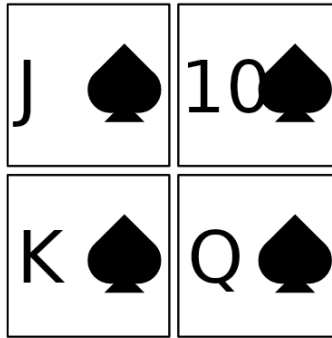
B



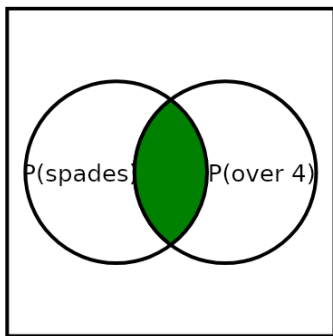


Probability - Set Operations - Examples

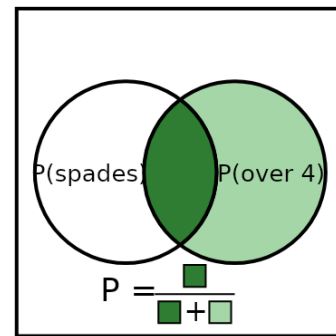
38 Which Venn diagram represents the probability of drawing a card that is both a spade and over 4?



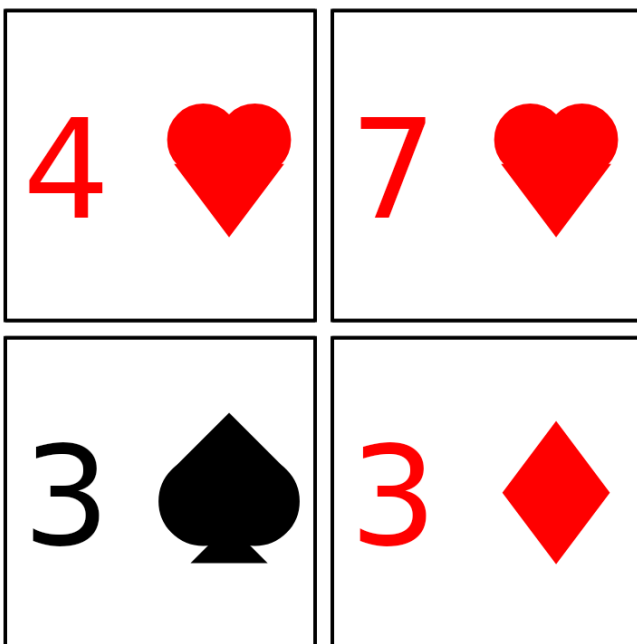
A



B



39 What formula would give you the chance of not drawing a card that is under 8?



A

$$\frac{P(\text{under } 8 \cap \text{under } 8)}{P(\text{under } 8)}$$

B

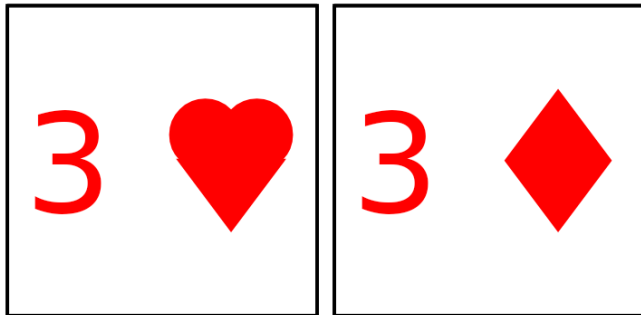
$$1 - P(\text{under } 8)$$

C

$$P(\text{under } 8) + P(\text{under } 8) - P(\text{under } 8 \cap \text{under } 8)$$

**Probability - Set Operations - Examples**

40 What formula would give you the chance of drawing a card that is both a 3 and red?



A

$$P(3) \cdot P(\text{red})$$

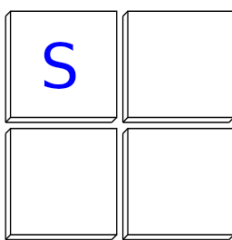
B

$$P(3) + P(\text{red}) - P(3 \cap \text{red})$$

C

$$1 - P(3)$$

41 What set operation would give you the probability of drawing an 'S' twice in a row?



A

Complement of S_1

B

 S_1 intersect S_2

42 How many students are in at least one of the two groups?

In a group of students, 52 run track, 15 swim, 11 do both, and 44 are in neither group.

A

56

B

54

C

89

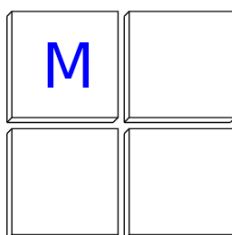
D

78

E

67

43 What set operation would give you the probability of the selected letter being 'M', if you know that the selected letter is before 'Z' in the alphabet?



A

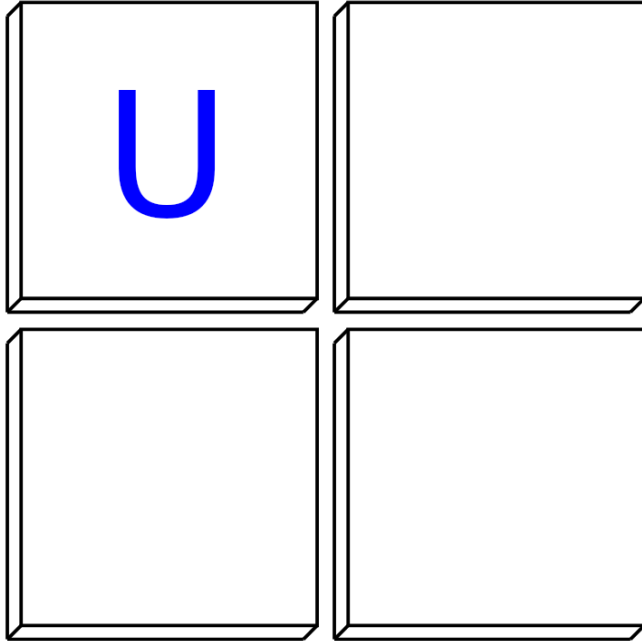
$$P('M' | \text{before 'Z'})$$

B

$$P('M' \cap \text{before 'Z'})$$

**Probability - Set Operations - Examples**

44 What set operation would give you the probability of drawing an 'U' twice in a row?



A

 $U_1 \text{ intersect } U_2$

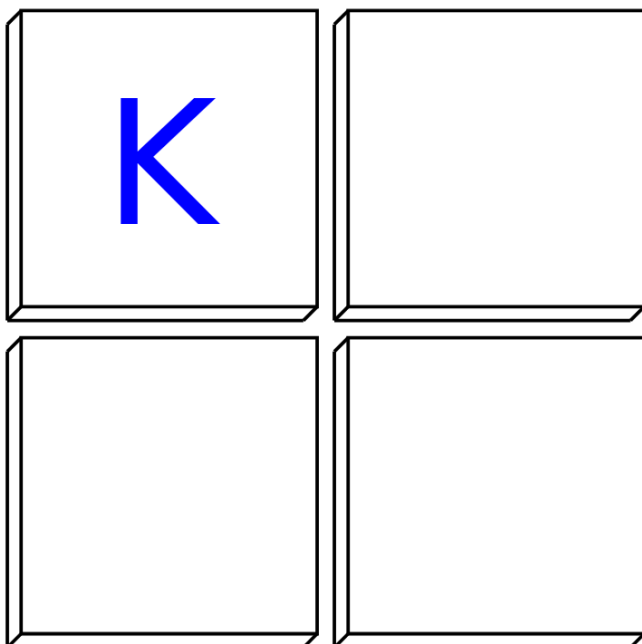
B

 $U_1 \text{ conditional on } U_2$

C

Complement of U_1

45 What set operation would give you the probability of drawing an 'K' twice in a row?



A

 $P(K_1')$

B

 $P(K_1|K_2)$

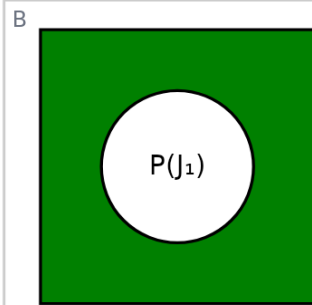
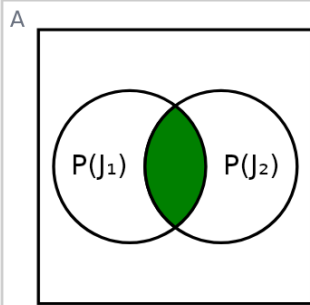
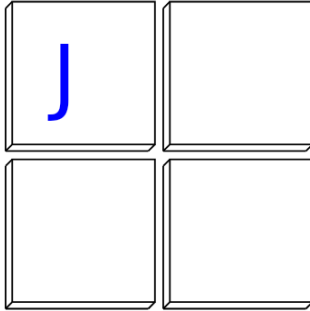
C

 $P(K_1 \cap K_2)$

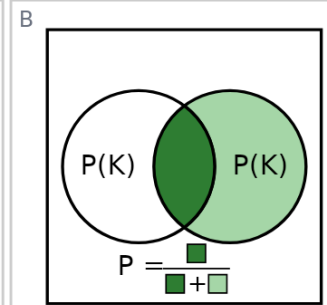
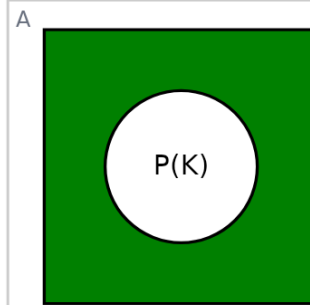
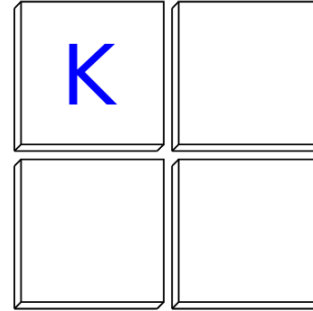


Probability - Set Operations - Examples

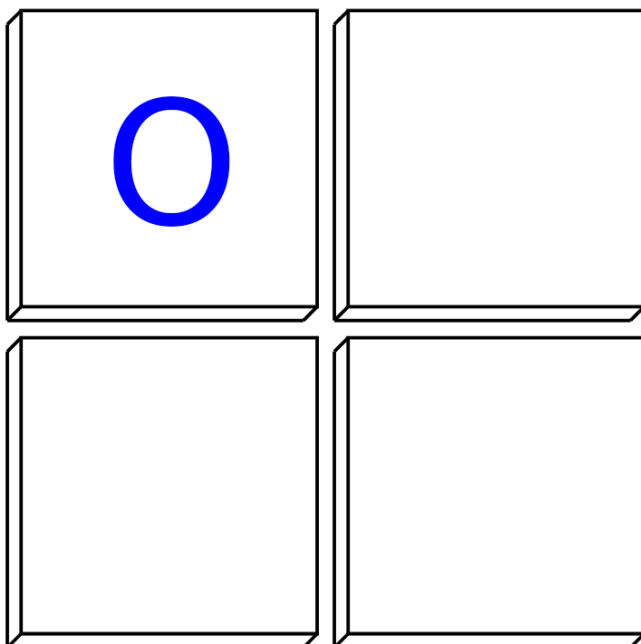
46 Which Venn diagram represents the probability of drawing an 'J' twice in a row?



47 Which Venn diagram represents the probability of not drawing an 'K'?



48 What formula would give you the chance of drawing an 'O' at least once given two tries?



A

$$\frac{P(O_1 \cap O_2)}{P(O_2)}$$

B

$$P(O_1) + P(O_2) - P(O_1 \cap O_2)$$

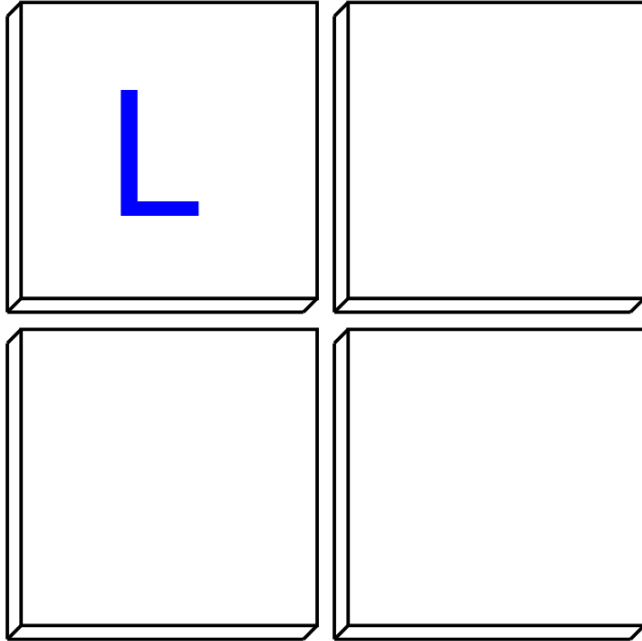
C

$$1 - P(O_1)$$



Probability - Set Operations - Examples

49 What formula would give you the chance of drawing an 'L' twice in a row?



A

$$P(L_1) \cdot P(L_2)$$

B

$$1 - P(L_1)$$

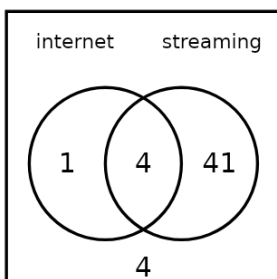
C

$$\frac{P(L_1 \cap L_2)}{P(L_2)}$$

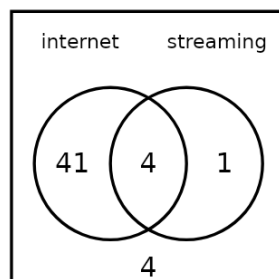
50 Which Venn diagram correctly shows the number of households in each region?

In a group of 50 households, 45 have internet, 5 have a streaming service, and 4 are in neither group.

A



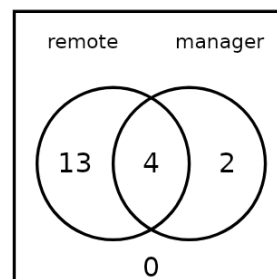
B



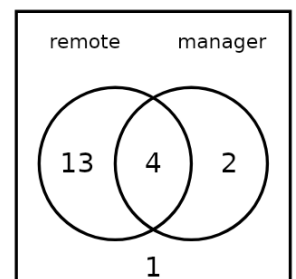
51 Which Venn diagram correctly shows the number of employees in each region?

In a group of 20 employees, 17 work remotely, 6 are managers, and 5% are in neither group.

A



B



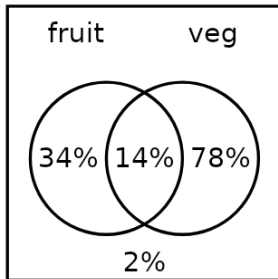


Probability - Set Operations - Examples

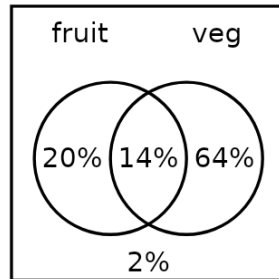
52 Which Venn diagram correctly shows the percentage of shoppers in each region?

In a survey of shoppers, 34% bought fruit, 78% bought vegetables, and 2% are in neither group.

A



B



53 Let A be the full-time group and B be the 10+ yrs group. Which expression gives the number of employees who are in at least one of the two groups?

In a group of 25 employees, 18 are in the full-time group but not the 10+ yrs group, 2 are in the 10+ yrs group but not the full-time group, and 2 are in neither group.

A

$$n(A) + n(B) + n(A \cap B)$$

B

$$n(A) \cdot n(B)$$

C

$$n(A) + n(B)$$

D

$$n(A) + n(B) - n(A \cap B)$$

54 Which set notation represents the students who are in at least one of the two groups?

In a group of 50 students, 4 play hockey, 2 play both, and 29 are in the volleyball group but not the hockey group.

A

$$n(\text{Hock}) + n(\text{Voll})$$

B

$$n(\text{Hock} \cup \text{Voll})'$$

C

$$n(\text{Hock} \cap \text{Voll})$$

D

$$n(\text{Hock} \cup \text{Voll})$$

55 Which set notation represents the library books who are in neither group?

In a group of 25 library books, 15 are fiction, 12% are both, and 2 are in the hardcover group but not the fiction group.

A

$$n(\text{Fict}) + n(\text{Hard})$$

B

$$n(\text{Fict} \cap \text{Hard})$$

C

$$n(\text{Fict} \cup \text{Hard})$$

D

$$n(\text{Fict} \cup \text{Hard})'$$



Probability - Set Operations - Examples

56 Which set notation represents the employees who are in at least one of the two groups?

In a survey of employees, 16% work in sales, 48% work in marketing, and 8% work in both.

A	$n(\text{Sale} \cup \text{Mark})'$
B	$n(\text{Sale} \cap \text{Mark})$
C	$n(\text{Sale} \cup \text{Mark})$
D	$n(\text{Sale}) + n(\text{Mark})$

57 Let A be the remote group and B be the manager group. Which expression gives the number of employees who are in at least one of the two groups?

In a group of 25 employees, 18 work remotely, 20% are both, and 4% are in the manager group but not the remote group.

A	$n(A) + n(B)$
B	$n(A) + n(B) - n(A \cap B)$
C	$n(A) + n(B) + n(A \cap B)$
D	$n(A) \cdot n(B)$

58 How many employees are in the trained group but not the certified group?

In a group of 20 employees, 12 completed training, 50% hold a certification, and 15% are in neither group.

A	5	B	17	C	7
D	8	E	12		

59 What percent of the voters are in the cand. A group?

In a group of voters, 3 support both, 13 are in the cand. A group but not the cand. B group, 2 are in the cand. B group but not the cand. A group, and 2 are in neither group.

A	95%	B	87%
C	65%	D	80%

60 Let A be the bought group and B be the coupon group. Which expression gives the number of customers who are in neither group?

In a survey of customers, 22% made a purchase this month, 34% used a coupon, and 18% did both.

A	$N - n(A) - n(B) + n(A \cap B)$
B	$N - n(A) - n(B) - n(A \cap B)$
C	$N - n(A) - n(B)$
D	$n(A) + n(B) - n(A \cap B)$



Probability - Set Operations - Examples

- 61** What percent of the households are in at least one of the two groups?

In a group of 100 households, 91% own a dog, 6 own both, and 2 are in the cat group but not the dog group.

A	82%	B	105%	C	93%
D	99%	E	94%		

- 62** What percent of the conference attendees are in the shop B group?

In a survey of conference attendees, 20% joined both, 12% are in the shop A group but not the shop B group, and 44% are in the shop B group but not the shop A group.

A	84%	B	72%
C	64%	D	44%

- 63** If one of the employees is chosen at random, what is the probability they are in the certified group but not the trained group?

In a group of 25 employees, 21 completed training, 4 have both, and 1 are in neither group.

A	$\frac{3}{25}$	B	$\frac{11}{25}$
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- 64** If one of the students is chosen at random, what is the probability they are in the soccer group but not the basketball group?

In a group of 100 students, 65% play basketball, 38 play soccer, and 12% are in neither group.

A	$\frac{19}{50}$	B	$\frac{23}{100}$
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- 65** If one of the students is chosen at random, what is the probability they are in neither group?

In a survey of students, 59% ride a bicycle, 55% ride a skateboard, and 21% ride both.

A	$\frac{21}{100}$	B	$\frac{3}{50}$
C	$\frac{7}{100}$		