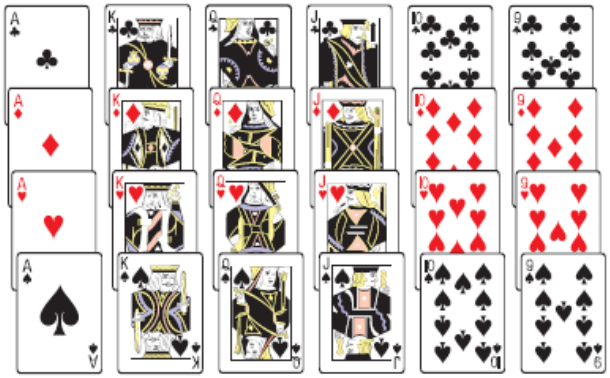
Solutions

1. What is the probability of rolling a 3 or 4 using a standard die?

A $\frac{1}{6}$ B $\frac{1}{4}$ C $\frac{1}{3}$ D $\frac{1}{2}$

$P(3 \text{ or } 4) = P(3) + P(4)$
$= \frac{1}{6} + \frac{1}{6}$
$= \frac{2}{6}$
$= \frac{1}{3} \Rightarrow C$

2. The card game euchre uses only the cards shown from a standard deck of playing cards.



What is the probability of randomly drawing an ace or a king from a euchre deck of cards?

A $\frac{5}{12}$ B $\frac{1}{2}$ C $\frac{7}{12}$ D $\frac{1}{3}$

$P(A \text{ or } K) = P(A) + P(K)$
$= \frac{4}{24} + \frac{4}{24}$
$= \frac{8}{24}$
$= \frac{1}{3} \Rightarrow D$

3. **Communication** Kara's shirt collection is shown below.

Her shirts are jumbled in a drawer.

a) Determine the probability that Kara randomly draws each of the following:
- a pink shirt or a purple shirt
- a pink shirt or a short-sleeved shirt

b) Which of the scenarios in a) represent:
- a mutually exclusive event?
- a non-mutually exclusive event?

Explain your answers.

a) $P(\text{Pink or Purple}) = P(\text{Pink}) + P(\text{Purple})$

$= \frac{2}{5} + \frac{1}{5}$

$= \frac{3}{5}$

$P(\text{Pink or Short Sleeve}) = P(\text{Pink}) + P(\text{SS}) - P(\text{Pink SS})$

$= \frac{2}{5} + \frac{3}{5} - \frac{1}{5}$

$= \frac{4}{5}$

b) Mutually exclusive → Pink or Purple [can't be pink AND purple]

Non-mutually exclusive → Pink or Short Sleeve

4. **Application** Every Friday night, Rutger's family orders take-out. The table shows their ordering habits for the past several weeks.

Type of Food	Tally
Pizza	𝍸
Mexican	||
Burgers	𝍸 ||
Chicken	|||

Rutger's favourites are Mexican and chicken. What is the experimental probability that Rutger will get one of his favourites next Friday?

Total orders

$= 5 + 2 + 4 + 3$

$= 14$

$P(\text{Mexican or Chicken}) = P(\text{Mexican}) + P(\text{Chicken})$

$= \frac{2}{14} + \frac{3}{14}$

$= \frac{5}{14}$

5. What is the probability of rolling a sum that is not a 7 or an 11 with a pair of dice?

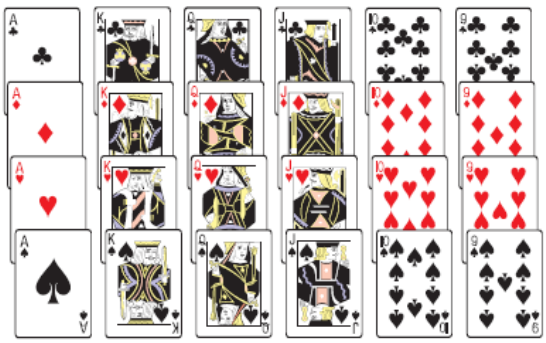
$$P(\text{Not 7 or 11}) = 1 - P(7 \text{ or } 11)$$
$$= \frac{36}{36} - \frac{8}{36}$$
$$= \frac{28}{36}$$
$$= \frac{7}{9}$$

6. Refer to the euchre deck of cards in #2.

a) Determine the probability of randomly drawing either an ace or a spade from the deck.

b) What is the probability of randomly drawing a red card or a diamond from the deck?

c) What is the probability of not drawing a face card or a club?



a) $P(A \text{ or } S)$
$= P(A) + P(S) - P(A \text{ of } S)$
$= \frac{4}{24} + \frac{6}{24} - \frac{1}{24}$
$= \frac{9}{24}$
$= \frac{3}{8}$

b) $P(R \text{ or } D)$
$= P(R) + P(D) - P(RD)$
$= \frac{12}{24} + \frac{6}{24} - \frac{6}{24}$
$= \frac{12}{24} = \frac{1}{2}$

c) $P(\text{Not Face or Club}) = 1 - P(\text{Face or Club})$
$= \frac{24}{24} - \left(\frac{12}{24} + \frac{6}{24} - \frac{3}{24}\right)$
$= \frac{24}{24} - \frac{15}{24}$
$= \frac{9}{24} = \frac{3}{8}$

7. Refer to the euchre deck of cards in #2.

a) What is the probability of randomly drawing a 9 or a 10 or a diamond from the deck?

b) Explain how you solved this problem.

a) $P(9 \text{ or } 10 \text{ or } D)$

$= P(9) + P(10) + P(D) - P(9 \text{ of } D) - P(10 \text{ of } D)$

$= \frac{4}{24} + \frac{4}{24} + \frac{6}{24} - \frac{1}{24} - \frac{1}{24}$

$= \frac{12}{24}$

$= \frac{1}{2}$

b) Add the probability of each outcome and then subtract the repeats of the 9 and 10 of diamonds (counted twice). These are the principles of inclusion and exclusion.

9. Juliette puts these letter tiles into her handbag.

a) If Juliette then reaches into the handbag and randomly takes out one tile, determine the probability of each of the following occurring:
- She chooses an "e" or a "t."
- She chooses a red letter or an "e."
- She chooses a capital letter or a vowel.
- She does not choose a yellow letter or a "t."

b) Draw a Venn diagram to represent each scenario in part a).

c) **Open Question** Create a probability question using these tiles for which the answer is between 25% and 40%.

a) $P(E \text{ or } T) = P(E) + P(T)$

$= \frac{2}{8} + \frac{2}{8}$

$= \frac{4}{8} = \frac{1}{2}$

$P(\text{Red or } E) = P(\text{Red}) + P(E) - P(\text{Red } E)$

$= \frac{3}{8} + \frac{2}{8} - \frac{1}{8}$

$= \frac{4}{8} = \frac{1}{2}$

$P(\text{Capital or Vowel}) = P(\text{capital}) + P(\text{vowel})$

$= \frac{1}{8} + \frac{3}{8}$

$= \frac{4}{8} = \frac{1}{2}$

$P(\text{Not yellow or not T}) = 1 - P(\text{Yellow or T})$

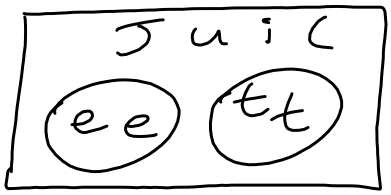
$= 1 - (P(Y) + P(T) - P(YT))$

$= 1 - \left(\frac{2}{8} + \frac{2}{8} - \frac{1}{8}\right)$

$= \frac{8}{8} - \frac{3}{8}$

$= \frac{5}{8}$

b) "e" or "t"



c) $P(\text{Blue or Black})$

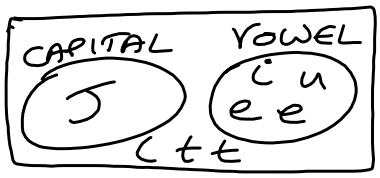
$= P(\text{Blue}) + P(\text{Black})$

$= \frac{1}{8} + \frac{2}{8}$

$= \frac{3}{8}$ (37.5%)

RED or "e"

CAPITAL or VOWEL



Not YELLOW or "t"