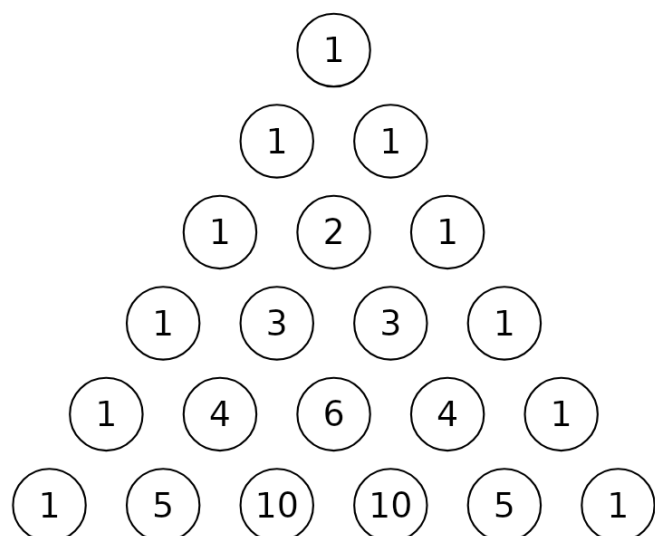




Counting and Probability

1 Use Pascal's triangle to fully expand this expression.



$$(2n + 2)^4$$

A

$$16n^4 + 64n^3 + 96n^2 + 64n + 16$$

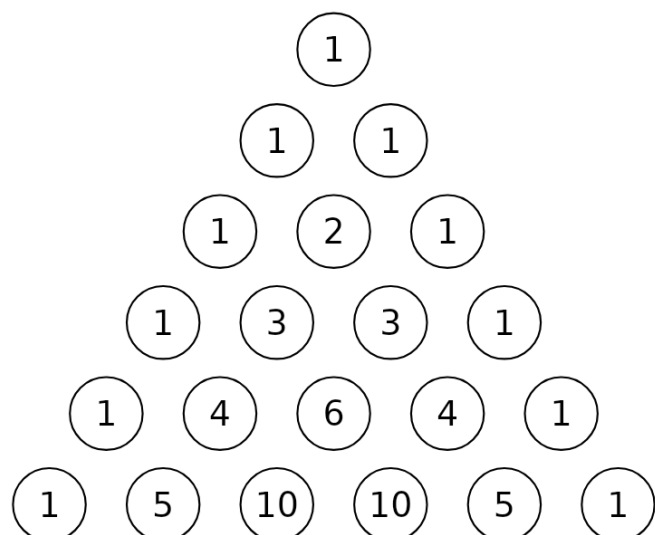
B

$$16n^4 + 48n^3 + 48n^2 + 16n$$

C

$$64n^3 + 96n^2 + 48n + 8$$

2 Use Pascal's triangle to fully expand this expression.



$$(m - 3)^3$$

A

$$m^3 - 6m^2 + 9m$$

B

$$-9m^2 - 18m - 9$$

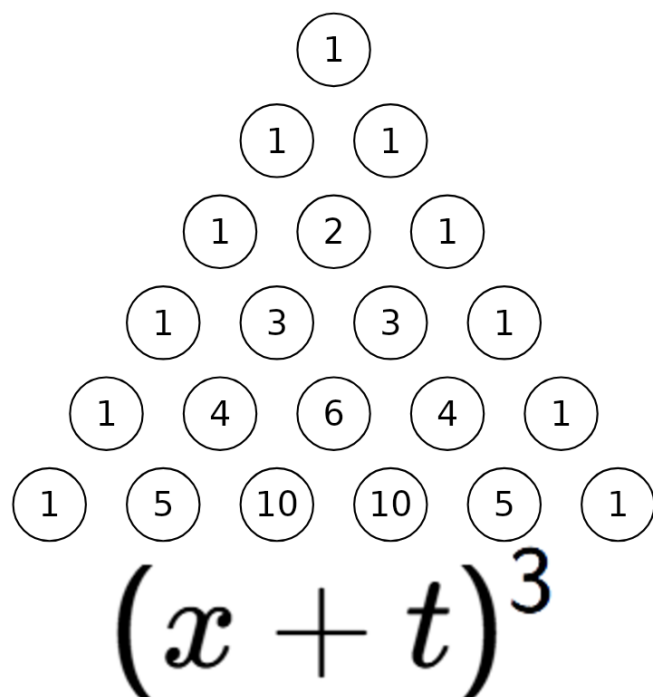
C

$$m^3 - 9m^2 + 27m - 27$$



Counting and Probability

3 Use Pascal's triangle to expand this expression.



A

$$x^3 + 3x^2t + 3xt^2 + t^3$$

B

$$x^3 + 4x^2t + 6xt^2 + 4t^3$$

C

$$x^3 + 2x^2t + xt^2$$

D

$$t^3 + 3xt^2 + 3x^2t + x^3$$

4 How many possible outcomes are in the sample space?

Four fair coins are flipped.

A

16

B

18

C

8

D

14

5 How many favourable outcomes are there?

Three fair six-sided dice are rolled. A favourable outcome is one where the total is less than 6.

A

216

B

206

C

10

D

11

6 How many different cars can you make?

You are putting together a custom car. You choose one color (red, black, grey) and one wheel set (sport, classic).

A

7

B

5

C

8

D

6

7 Select the correct number of ways.

From 5 runners, the finishing positions of the top 3 are recorded. How many finishing orders are possible?

A

60

B

6

C

5

D

3



Counting and Probability

8 Which multiplication gives the number of different cars you can make?

You are putting together a custom car. You choose one color (red, black, grey, white), one wheel set (sport, classic), and one interior (leather, cloth, vinyl). 6 of the possible cars are unavailable.

- | | |
|---|-----------------------------|
| A | $(4 \times 2 \times 3) - 6$ |
| B | $(4 \times 2 \times 3) - 7$ |
| C | $(4 \times 2 \times 3) + 6$ |
| D | $4 \times 2 \times 3$ |

9 Select the correct value for when this formula is calculated
 $\frac{6!}{2! \cdot 4!}$

- | | | | |
|---|------------------|---|------------------|
| A | $\frac{720}{48}$ | B | $\frac{720}{24}$ |
| C | $\frac{120}{12}$ | | |

10 Select the correct value for when the described situation is calculated

With a group of 4 options how many ways are there to choose a set of 2 options regardless of order?

- | | | | |
|---|-----------------|---|----------------|
| A | $\frac{24}{2}$ | B | $\frac{24}{4}$ |
| C | $\frac{7}{100}$ | | |

11 Select the correct value for when this notation is calculated
 $\{5 \choose 3\}$

- | | | | |
|---|------------------|---|-----------------|
| A | $\frac{6}{6}$ | B | $\frac{6}{120}$ |
| C | $\frac{120}{12}$ | | |

12 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.

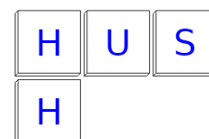
- | | | | |
|---|-----------------|---|------------------|
| A | $\frac{3}{50}$ | B | $\frac{21}{100}$ |
| C | $\frac{7}{100}$ | | |

13 Select the correct factorial formula.

From a group of 4 students, 3 distinct officer positions (such as president and vice-president) are filled. How many ways are there?

- | | | | |
|---|--------------------------|---|------|
| A | $\frac{6!}{4!}$ | B | $4!$ |
| C | $\frac{4!}{3! \cdot 1!}$ | D | $3!$ |

14 How many ways can these letter tiles be ordered to spell 'HUSH'?

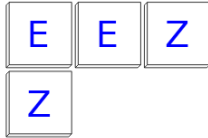


- | | | | | | |
|---|----|---|---|---|---|
| A | 24 | B | 6 | C | 2 |
| D | 12 | E | 4 | | |



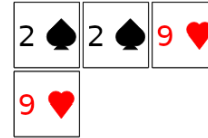
Counting and Probability

15 How many distinct ways can these letter tiles be ordered?



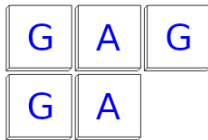
A	2	B	11	C	0
D	3	E	6	F	20

16 How many distinct ways can these cards be ordered?



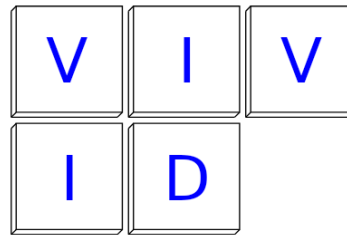
A	5	B	4	C	10
D	6	E	20	F	9

17 How many distinct ways can these letter tiles be ordered?



A	10	B	30	C	6
D	3	E	15	F	0

18 How many ways can these letter tiles be ordered to spell 'VIVID'?



A	4
B	12
C	48

19 What is the probability of getting a favourable outcome?

Two fair coins are flipped. A favourable outcome is one where there is exactly one head. There are 2 favourable outcomes.

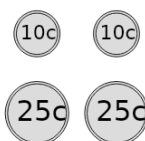
A	$\frac{3}{4}$	B	$\frac{1}{4}$
C	$\frac{1}{2}$	D	$\frac{2}{5}$

20 What is the probability of getting a favourable outcome?

A fair coin is flipped and a spinner with red, green, and blue sections is spun. There are 6 equally likely outcomes in the sample space. A favourable outcome is one where the coin shows heads.

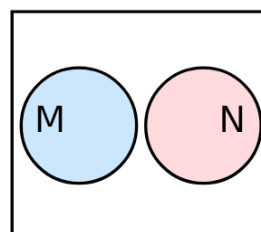
A	$\frac{1}{2}$	B	$\frac{1}{3}$
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21 What is the chance of flipping a mixed set (not all heads or all tails) on these coins?



A	0.875	B	0.538	C	1.125
D	0.313	E	1.25	F	0.692

22 Based on this Venn diagram, are events M and N mutually exclusive?

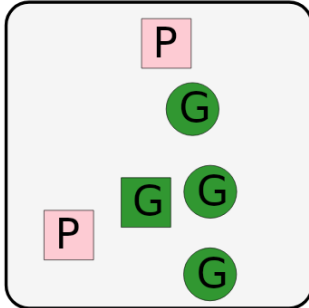


A	Yes
B	No



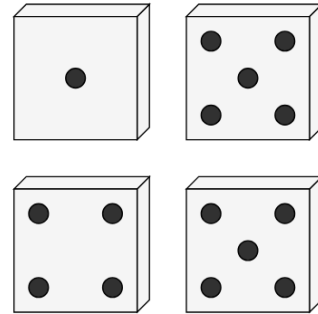
Counting and Probability

23 What is the chance of drawing two squares in a row at random from this bag?



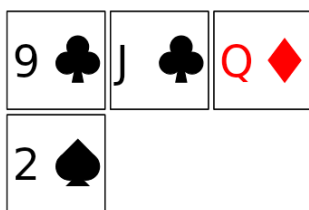
A	$\frac{1}{4}$	B	$\frac{3}{5}$
C	$\frac{6}{30}$	D	$\frac{5}{5}$
E	$\frac{1}{2}$	F	$\frac{4}{8}$

24 What is the chance of rolling the same number on all these dice?



A	$\frac{1}{216}$	B	$\frac{1}{403}$
C	$\frac{3}{226}$	D	$\frac{2}{376}$
E	$\frac{3}{364}$	F	$\frac{3}{74}$

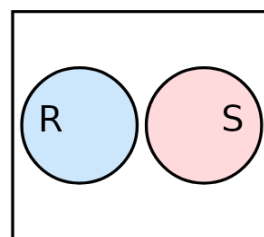
25 Calculate the probability of drawing Jack, Queen in order. Show as a fraction



P(J, Q in order)

A	$\frac{13}{7}$	B	$\frac{1}{12}$
C	$\frac{4}{25}$	D	$\frac{5}{17}$
E	$\frac{3}{13}$		

26 Based on this Venn diagram, which statement best describes events R and S?



- A Both mutually exclusive and independent
- B Independent, but not mutually exclusive
- C Mutually exclusive, but not independent
- D Neither mutually exclusive nor independent

27 Are events A and B independent?

Three fair six-sided dice are rolled. Event A: The total is exactly 7. Event B: The second die shows a number greater than 4.

- A Yes, events A and B are independent.
- B No, events A and B are not independent.

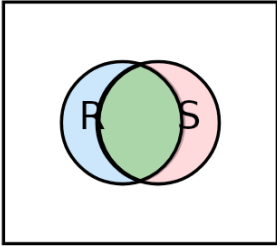


Counting and Probability

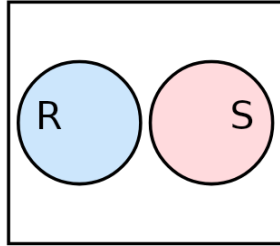
28 Which Venn diagram matches this information?

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

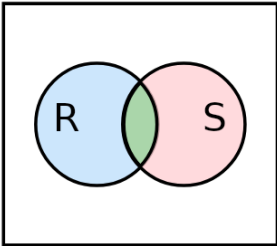
A



B



C



29 How are events A and B related?

Three fair six-sided dice are rolled. Event A: The total is exactly 6. Event B: The second die shows a 1.

A They are independent but not mutually exclusive.

B They are neither mutually exclusive nor independent.

C They are mutually exclusive but not independent.

D They are both mutually exclusive and independent.

30 How many different gift baskets can you make?

You are putting together a gift basket. You choose one theme (spa, food, books) and one wrapping (red, gold). 1 of the possible gift baskets is unavailable.

A

4

B

5

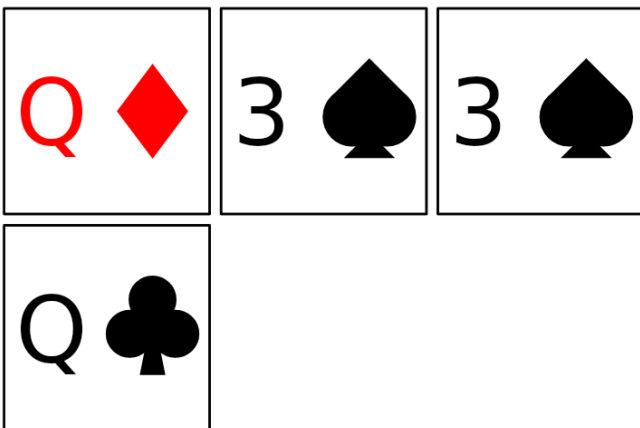
C

6

D

7

31 Calculate the probability of drawing 2 Queens. Show as a description of the equation needed



P(2 Qs)

A

$$\frac{\text{ways to draw 2 Queens from 2 options}}{\text{ways to order 4 cards}}$$

B

$$\frac{\text{ways to draw 2 Queens from 2 options}}{\text{ways to draw 2 cards from 4}}$$

C

$$\frac{\text{ways to draw 2 cards from 4}}{\text{ways to draw 2 Queens from 2 options}}$$