

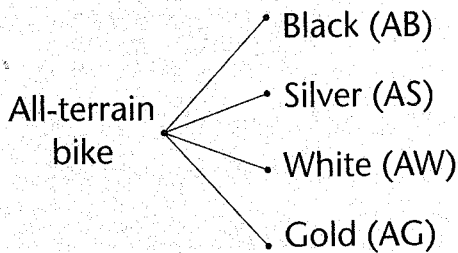
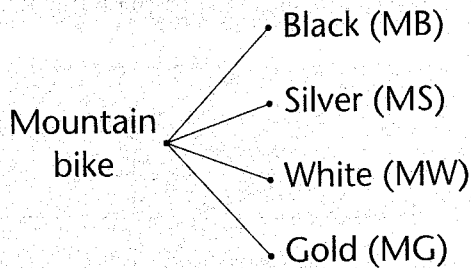
**EXAMPLE**

Jimmie wants to buy a new bike. He can choose a mountain bike or an all-terrain bike. The colours available are black, silver, white and gold. If all choices are equally likely,

- in how many ways can Jimmie choose a new bike?
- what is the probability that his bike will be black?
- what is the probability that it will be an all-terrain bike?
- what is the probability that it will be a black all-terrain bike?

Solutions :

Tree Diagram



a. Jimmie can choose a bike in 8 ways.

b. 
$$P(\text{black}) = \frac{\text{No. of bikes which are black}}{\text{Total number of bikes}}$$

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

c. 
$$P(\text{all-terrain}) = \frac{\text{No. of all-terrain bikes}}{\text{Total number of bikes}}$$

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

d. 
$$P(\text{black all-terrain}) :$$

$$= \frac{\text{No. of black all-terrain bikes}}{\text{Total number of bikes}}$$

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

**Solve the problems. Show your work.**

① Ann flipped a coin 50 times and heads turned up 24 times.

a. What fraction of the flips turned up heads?

Answer :  $\frac{24}{50}$  or  $\frac{12}{25}$

b. Is this what you would expect?

Answer :  $\frac{1}{2}$  25  
I would expect close to 25.

c. If the coin is fair and Ann flips the coin 500 times, how many times should she expect it to come up heads?

Answer: 250 times

d. What fraction of the flips should come up heads if she flips the coin many times?

Answer:  $\frac{1}{2}$  of the flips should come up heads

e. If the first 5 flips are all heads, what is the probability that the next flip will be heads?

Answer: Probability of heads is  $\frac{1}{2}$  or 1:2

f. Is it possible to flip a coin 20 times and have it turn up heads every time? Is this likely to happen?

Answer: Yes, but unlikely to happen.

② Carol and Debbie play a coin-tossing game. They take turns tossing 2 coins. If both coins match, Carol gets a point. If the coins don't match, Debbie gets a point. The first player to get 10 points wins. Who is likely to win? Illustrate your answer with a tree diagram in the box.

H	- H	(H,H) Carol	Both likely, both with same chances.
	- T	(H,T) Debbie	
T	- H	(T,H) Debbie	
	- T	(T,T) Carol	

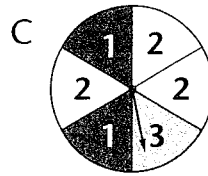
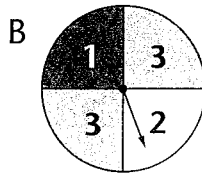
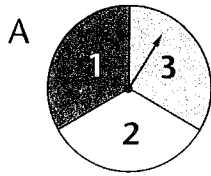
Answer:

③ Eric and Frank also play a coin-tossing game but they use 3 coins. If 3 coins match, Eric gets a point. If only 2 coins match, Frank gets a point. The first to score 10 points wins. Who is likely to win? Illustrate your answer with a tree diagram in the box.

		H	(HHH) Eric	Frank is likely to win.
H-heads	H	- H	(HHT) Frank	
		- T	(HTH) Frank	
T-Tails	T	- H	(HTT) Frank	
		- T	(THT) Frank	
	T	- H	(THT) Frank	
		- T	(TTH) Frank	
			(TTT) Eric	

Answer:

④ George spun each of the spinners below 30 times.



a. What is the probability that the result will be a 3 in each case?

Spinner A:  $P(3) = \frac{1}{3}$  or 1:3  
 Spinner B:  $P(3) = \frac{2}{4}$  or 1:2 or 2:4  
 Answer: Spinner C:  $P(3) = \frac{1}{6}$  or 1:6

b. How many times should he expect each spinner to land on a 3?

Spinner A: 10 times  
 Spinner B: 15 times  
 Answer: Spinner C: 5 times

c. Does the probability of landing on a 3 depends on the number of times he spun each spinner?

No, it does not depend on # of spins, but  
 Answer: the more spins the more accurate in the real world

d. Which of the spinners would give a fair game of chance?

Spinner A

Answer:

⑤ In a TV guessing game, a bucket is filled with an unknown number of coloured balls. Members of the audience are asked to guess and write down, one after the other, the colour of the ball that would be drawn. If the guess is correct, they win a prize.

a. Would it be better to write first or last? Explain.

It does not matter, because the priority of guessing does not affect the probability of getting the correct coloured ball.  
 Answer:

b. If the bucket contains 10 red, 20 white and 30 black balls, what is the probability that a white ball will be drawn?

$P(w) = \frac{20}{60} = \frac{1}{3}$  or 1:3      Probability  $\frac{1}{3}$  or 1:3

Answer:

c. What is the most likely outcome if the ball is drawn randomly?

most likely outcome is getting a black ball

Answer:

⑥ When I toss a fair die,

a. what is the probability that the die will show a 4?

$$P(4) = \frac{1}{6} \text{ or } 1:6$$

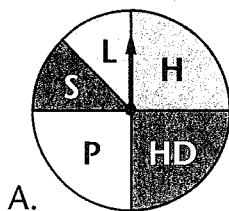
Answer: \_\_\_\_\_

b. what is the probability that the die will show a number greater than 4?

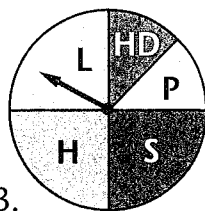
$$P(5) = \frac{1}{6} \quad P(6) = \frac{1}{6} \quad \frac{2}{6} \text{ total}$$

Answer:  $\frac{2}{6}$  or  $\frac{1}{3}$  1:3 (1 out of 3 times)

⑦ Mrs Smith has made 2 spinners to help determine what she will make for lunch.



A.



B.

S – spaghetti

P – pizza

H – hamburger

HD – hot dog

L – lasagna

a. What is the probability that there will be hamburgers for lunch if only spinner B is spun?

$$P(H) = \frac{2}{8} \text{ or } \frac{1}{4}$$

Answer:  $\frac{1}{4}$

b. If you like spaghetti, which spinner would you like Mrs Smith to use?

Spinner B

Answer: \_\_\_\_\_

c. Frankie uses spinner A to predict the outcome and gets points if his prediction is correct. He can get 2 points for guessing that the outcome is hamburger. How many points should he get for guessing lasagna?

Explain. Using Spinner A: He should 4 points for guessing lasagna for its half the probability compared to hamburger.

Answer: compared to hamburger.

⑧ When 2 dice are rolled and the numbers on the upper faces are added, there are 12 different possible sums.

a. Complete the sum chart below to show the possible outcomes.

⊕	1	2	3	4	5	6
1	2	3	4	5	6	7
2	3	4	5	6	7	8
3	4	5	6	7	8	9
4	5	6	7	8	9	10
5	6	7	8	9	10	11
6	7	8	9	10	11	12

b. Are all the different sums equally likely?

No they are not

Answer: \_\_\_\_\_

c. What is the probability that the sum on the 2 dice is 4?

$$\frac{3}{36} \text{ or } 3:36 \text{ which is } 1:12$$

Answer: \_\_\_\_\_

d. Which sum is most likely? The sum of 7 is most likely.

$$\text{Answer: } \frac{6}{36} = \frac{1}{6} = 1:6$$