

Introduction to Probability

Case 1:

If tuberculous meningitis had a case fatality of 20%,

- (a) Find the probability that this disease would be fatal in two randomly selected patients (the two events are independent)
- (b) If two patients are selected randomly what is the probability that at least one of them will die?

Case 2:

In a normally distributed population, the probability that a subject's blood cholesterol level will be lower than 1 SD below the mean is 16% and the probability of being blood cholesterol level higher than 2 SD above the mean is 2.5%.

- (a) What is the probability that a randomly selected subject will have a blood cholesterol level lower than 1 SD below the mean or higher than 2 SD above the Mean.

Case 3

Assuming these data are representative of a larger population, what is the approximate probability that someone from that population who sleeps with a nightlight in early childhood will develop some degree of myopia?

Slept with:	No Myopia	Myopia	High Myopia	Total
Darkness	155 (90%)	15 (9%)	2 (1%)	172
Nightlight	153 (66%)	72 (31%)	7 (3%)	232
Full Light	34 (45%)	36 (48%)	5 (7%)	75
Total	342 (71%)	123 (26%)	14 (3%)	479

Case 4

<u>Person</u>	<u>Sex</u>	<u>Age</u>
1	Male	31
2	Male	33
3	Female	46
4	Female	29
5	Male	41

If the members of the council decide to elect a chairperson by random draw (say, by drawing the names from a hat), what is the probability that the chairperson will be either female or over 35?

Case 5:

<u>Years of experience</u>	<u>Numbers</u>	<u>Probability</u>
0-2	5	$5/50 = 1/10 = .1$
3-5	10	$10/50 = 1/5 = .2$
6-8	15	$15/50 = 3/10 = .3$
<u>More than 8</u>	<u>20</u>	<u>$20/50 = 2/5 = .4$</u>
Total	50	

What is the probability that welder selected at random will have 6 or more years of experience?

Case 6:

You own an ALL DAY Convenience Store, and you have the following Product inside:

Product A - 30 pieces
Product B - 32 pieces
Product C - 50 pieces
Product D - 55 pieces
Product E - 29 pieces

- (a.) What is the chance that a customer will pick out product A?
(b.) What is the chance that a customer can pick out the products?

in this order: B, D, C, E, A?

1. Race cars for a particular race are numbered sequentially from 12 to 115. What is the probability that a car selected at random will have a tens digit of 1? Explain

Possible Answers:

$$\frac{13}{104}$$

$$\frac{14}{103}$$

$$\frac{8}{103}$$

$$\frac{1}{13}$$

$$\frac{7}{52}$$

2. Three friends play marbles each week. When they combine their marbles, they have 100 in total. 45 of the marbles are new and the rest are old. 30 are red, 20 are green, 25 are yellow, and the rest are white. What is the probability that a randomly chosen marble is new OR yellow? Explain

Possible Answers:

$$\frac{3}{13}$$

$$\frac{4}{53}$$

$$\frac{1}{2}$$

$$\frac{47}{80}$$

$$\frac{7}{15}$$

3. Flight A is on time for 93% of flights. Flight B is on time for 89% of flights. Flight A and B are both on time 87% of the time. What is the probability that at least one flight is on time? Explain

Possible Answers:

0.93

0.95

1.82

0.89

0.87

4. At a school fair, there are 25 water balloons. 10 are yellow, 8 are red, and 7 are green. You try to pop the balloons. Given that you first pop a yellow balloon, what is the probability that the next balloon you hit is also yellow? Explain

Possible Answers:

$\frac{2}{5}$

$\frac{5}{12}$

$\frac{9}{25}$

$\frac{3}{5}$

$\frac{3}{8}$

5. A red die and a white die are rolled. What is the probability of getting a 4 on the red die AND an odd sum of numbers on the two dice? Explain

Possible Answers:
$\frac{1}{6}$
$\frac{1}{2}$
$\frac{1}{5}$
$\frac{1}{36}$
$\frac{1}{12}$

6. One hundred marbles - each one red, yellow, blue, or green - are placed in a box. Forty of the marbles are green, there are twice as many blue marbles as there are red ones, and there are three times as many yellow marbles as red ones. What is the probability that a randomly drawn marble will be yellow? Explain

Possible Answers:
$\frac{1}{5}$
$\frac{3}{10}$
$\frac{1}{10}$
$\frac{3}{20}$
$\frac{2}{5}$