

Warm-up

1) A die is rolled 3 times. What is the probability of all 2s or all 5s?

$$\left(\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6}\right) + \left(\frac{1}{6} \cdot \frac{1}{6} \cdot \frac{1}{6}\right) \quad 1/108$$

2) A quiz has 6 questions and 5 answer choices. What is the probability of completely guessing and getting exactly 3 correct?

$${}^6C_3 \left(\frac{1}{5}\right)^3 \left(\frac{4}{5}\right)^3 \quad 256 / 3125$$

At least 4 correct?

$$\begin{aligned} & 4 \checkmark + {}^6C_4 \left(\frac{1}{5}\right)^4 \left(\frac{4}{5}\right)^2 \\ & 5 \checkmark + {}^6C_5 \left(\frac{1}{5}\right)^5 \left(\frac{4}{5}\right)^1 \\ & 6 \checkmark + {}^6C_6 \left(\frac{1}{5}\right)^6 \left(\frac{4}{5}\right)^0 \end{aligned} \quad 53 / 3125$$

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3) There are 9 men and 12 women on a council. How many ways could a committee be formed with 2 men and 3 women on it?

$${}^9C_2 \cdot {}^{12}C_3$$

7,920

4) Find the probability for #3.

$$\frac{{}^9C_2 \cdot {}^{12}C_3}{{}^{21}C_5}$$

880 / 2261

1) Bill has 5 red, 4 blue and 3 green light bulbs. How many ways could he arrange them?

$$\frac{12!}{5!4!3!} = \boxed{27,720}$$

2) Jill has 5 math, 4 science and 3 electives to choose from for courses. If she needs one of each, how many schedules would be possible?

$$5 \cdot 4 \cdot 3 = \boxed{60}$$

3) Twelve friends gather around a campfire, how many ways could they arrange themselves?

$$\frac{12!}{12} =$$

4) How many ways can a family of 12 sit around the table with one chair nearest the door?

$$12! =$$

5) Leslie has 12 jobs to do for the Parks Dept. and 8 tasks for her campaign, how many ways could she choose 3 jobs from the Parks Dept. and 2 tasks for her campaign?

$${}_{12}C_3 \cdot {}_8C_2 = \boxed{6,160}$$

6) How many ways could 3 people be selected to form a committee from a council of 12?

$${}_{12}C_3 = \boxed{220}$$

7) How many ways could a COO, CFO and CEO be elected from a board of 12 members?

$${}_{12}P_3 = \boxed{1320}$$

8) A ballot has 7 men and 5 women, what is the probability that a committee of 4 has 2 men and 2 women?

$$\frac{14}{33}$$

$$\frac{{}_7C_2 \cdot {}_5C_2}{{}_{12}C_4}$$

9) In the committee above, what is the probability the committee has at least 3 men?

3M/1W OR 4M

$$\frac{{}_7C_3 \cdot {}_5C_1}{{}_{12}C_4} + \frac{{}_7C_4}{{}_{12}C_4} = \frac{14}{33}$$

10) A spinner has 12 equal numbered sections. What is the probability of landing on an even number or a number greater than 7?

$$\frac{6}{12} + \frac{5}{12} - \frac{3}{12} = \frac{2}{3}$$

There is a bag of marbles; 8 red, 6 blue, 3 green and 3 yellow.

11) What is the probability of selecting a red or a green marble?

$$\frac{8}{20} + \frac{3}{20} = \frac{11}{20}$$

12) ... of selecting a blue, replace it, then a yellow?

$$\frac{6}{20} \cdot \frac{3}{20} =$$

$$\frac{9}{200}$$

13) ... of selecting 3 red marbles in a row?

$$\frac{8}{20} \cdot \frac{7}{19} \cdot \frac{6}{18} =$$

$$\frac{14}{285}$$

14) ... of selecting 5 marbles; 3 blue and 2 green?

$$\frac{{}^6C_3 \cdot {}^3C_2}{20C_5} =$$

$$\frac{5}{1292}$$

15) ... of selecting 5 marbles; at least 4 red?

4R OR 5R

16) ... of selecting 5 marbles; exactly 3 red (replacing)?

$${}^5C_3 \left(\frac{8}{20}\right)^3 \left(\frac{12}{20}\right)^2$$

17) ... of selecting 5 marbles; at least 4 blue (replacing)?

$$\frac{{}^8C_4 \cdot {}^{12}C_1}{20C_5} + \frac{{}^8C_5}{20C_5}$$

$$\begin{array}{l} 4B \\ \text{OR} \\ 5B \end{array} \quad {}^5C_4 \left(\frac{6}{20}\right)^4 \left(\frac{14}{20}\right)^1 + {}^5C_5 \left(\frac{6}{20}\right)^5 \left(\frac{14}{20}\right)^0 +$$

Use the table below to answer the following questions:

	Dogs	Cats	Other	Total
Men	28	12	4	44
Women	20	14	2	36
Total	48	26	6	80

What is the probability that...

18) ... someone selected prefers dogs? $\frac{48}{80} \rightarrow \frac{3}{5}$

19) ... someone selected is a woman that prefers cats? $\frac{14}{80} \rightarrow \frac{7}{40}$

20) ... someone selected prefers cats or dogs? $\frac{26}{80} + \frac{48}{80} = \frac{74}{80} \rightarrow \frac{37}{40}$

21) ... someone selected is a man or prefers dogs? $\frac{44}{80} + \frac{48}{80} - \frac{28}{80} = \frac{64}{80} \rightarrow \frac{4}{5}$

22) ... a man selected prefers other animals? $\frac{4}{44} \rightarrow \frac{1}{11}$

23) ... a dog lover selected is a woman? $\frac{20}{48} \rightarrow \frac{5}{12}$

24)

Outcome	\$-20	\$0	\$10	\$100
Probability	0.4	0.2	0.3	0.1

What is the expected outcome of playing the game 20 times?

25) In a game that costs \$25 to play; there is a $\frac{4}{7}$ chance you win \$14, a $\frac{2}{7}$ chance you win \$28 and a $\frac{1}{7}$ chance of winning \$35. What is the expected value? Is it worth playing?

26) The probability of rain in Harlan is 40%, the chance of reaching 60° is 75% and the probability of reaching 60° and raining is 24%.

a. What is the probability of it reaching 60° if you hear rain on the window?

b. What is the probability of it reaching 60° or raining?

27) Find the middle term: $(x + 4)^6$

28) Find the middle term: $(2x + 7)^{10}$

29) You roll a die 8 times, what is the probability of landing on a 3 exactly 2 times?

30) Everts wins 65% of their games. What is the probability that they win exactly 3 of their next 5 games?

31) What is the probability that they win at least 3 of their next 5 games?