PROBABILITY TERMS AND NOTATION.

In a particular college, there are some Math and some English students. Some students have long hair and some students have short hair. Write the formal descriptions for the probabilities of the events described below. Note that you cannot find numerical answers here. For example, "the probability that a student majors in Math" can be formally stated as $P(M)$.

Let M be the event that a student majors in Math.
Let E be the event that a student majors in English.
Let S be the event that a student has short hair.
Let L be the event that a student has long hair.

1. The probability that a student majors in Math or has long hair.

2. The probability that a student majors in English.

3. The probability that a student has short hair and majors in English.

4. The probability that a student does not have short hair.

5. The probability that a student has long hair, and does not major in Math.

6. The probability that a student does not major in English, or does not have short hair.

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7. E and F are mutually exclusive events with $P(E) = 0.4$ and $P(F) = 0.5$.
Find $P(E \mid F)$.

8. J and K are independent events. $P(J \mid K) = 0.3$.
Find $P(J)$.

9. Q and R are independent events with $P(Q) = 0.4$ and $P(Q \cap R) = 0.1$.
Find $P(R)$.

The experiment is to draw one card at random out of a well-shuffled standard 52-card deck.

10. What are the chances the card is a diamond suit?

11. What are the chances the card is an Ace?

The experiment is to select one piece at random out of the 32 pieces used in the standard chess game.

12. What are the chances the piece is a black Knight?

13. How likely is the piece to be a King or a Queen of either color?

Use the following information to answer the following exercises. There are 23 countries in North America, 12 countries in South America, 47 countries in Europe, 44 countries in Asia, 54 countries in Africa, and 14 in Oceania (Pacific Ocean region). The experiment is to pick one country at random.

Let $N =$ the event that a country is in North America.
Let $M =$ the event that a country is in South America.
Let $E =$ the event that a country is in Europe.
Let $A =$ the event that a country is in Asia.
Let $F =$ the event that a country is in Africa.
Let $O =$ the event that a country is in Oceania.

14. Find the size of the sample space.

15. Find $P(A)$

16. Find $P(F)$

17. Find $P(F')$

18. Find $P(O \cup M)$

19. Find $P(M \cup N)$

20. Find $P(E')$

ANSWERS.

1. $P(M \cup L)$

2. $P(E)$

3. $P(S \cap E)$

4. $P(S')$

5. $P(L \cap M')$

6. $P(E' \cup S')$

7. 0

9. 0.25

10. 0.25

12. 0.0625

14. 194

16. 0.2783505

18. 0.1340206

20. 0.757732