

M118 SECTION 8.3 – CONDITIONAL PROBABILITY, INTERSECTION, and INDEPENDENCE

1) The probability of an event may change if we are told of another event that has happened.

The probability of event A given that event B has happened is denoted by

$$P(A|B) = \frac{P(A \cap B)}{P(B)}.$$

Given a spinner with numbers 1-6.

e_i	1	2	3	4	5	6
$P(e_i)$.1	.2	.1	.1	.3	.2

a) What is the probability of a pointer landing on a prime number given that it landed on an odd number?

b) What is the probability of the pointer landing on a number greater than 4, given it landed on an even number.

#34a

A card is drawn at random from a standard 52-card deck. Events M and N are

M = the card drawn is a diamond

N = the card drawn is even (face cards have no value)

a) Find $P(N| M)$

Each person in a group of students was identified by his or her hair color and then asked whether he or she preferred taking classes in the morning, afternoon, or evening. The results are shown in the table below.

a) Find the probability that a student preferred morning classes given that he or she has blonde hair. _____

b) Find the probability that a student is brunette given that he or she prefers afternoon classes. _____

Class Time Preference	Hair Color		
	Blonde	Brunette	Redhead
Morning	45	25	10
Afternoon	40	15	50
Evening	35	20	30

PROBABILITY TREES:

#52 Ann and Barbara are playing a tennis match. The first player to win 2 sets wins the match. For any given set, the probability that Ann wins that set is $\frac{2}{3}$. Find the probability that

a) Ann wins the match _____

b) 3 sets are played _____

c) The player who wins the first set goes on to win the match. _____

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To transfer into a particular department, a company requires an employee to pass a screening test. A maximum of 3 attempts are allowed. From past records it is found that 40% pass on the first trial; of those that fail the first trial and take the test a second time, 60% pass; and of those who fail on the second trial and take it a third time, 20% pass. For an employee wishing to transfer:

a) What is the probability of passing the test on the first or second try?

b) What is the probability of failing on the first two trials and passing the third?

c) What is the probability of failing on all three attempts? _____

INDEPENDENT EVENTS: A and B are independent if and only if

$$P(A \cap B) = P(A) \cdot P(B)$$

Ex. A single card is drawn from a standard 52-card deck. Test for independence.

#34b

A card is drawn at random from a standard 52-card deck. Events M and N are

M = the card drawn is a diamond

N = the card drawn is even (face cards have no value)

b) Test M and N for independence.