1. All human blood can be typed as one of O, A, B, or AB. Different races have different probabilities of blood type. If you choose an African American at random, here are the approximate probabilities that the person you choose will have blood type O, B, or AB.

<table>
<thead>
<tr>
<th>Blood Type</th>
<th>O</th>
<th>A</th>
<th>B</th>
<th>AB</th>
</tr>
</thead>
<tbody>
<tr>
<td>Probability</td>
<td>50%</td>
<td>?</td>
<td>20%</td>
<td>5%</td>
</tr>
</tbody>
</table>

Use the data above to solve the questions below.

a. What is the probability that the person chosen has blood type A?

b. What is the probability that the person chosen has a blood type other than A?

c. What is the chance that the person chosen has either blood type O or B?

Suppose we choose two African Americans at random.

d. What is the chance that the first person chosen is type AB?

e. What is the chance that the second person chosen is type AB?

f. What is the chance that the second person chosen is type AB, given that the first person chosen is type AB?

g. What is the chance that both chosen are type B?

Suppose we choose five African Americans at random.

h. What is the chance that at least one of the five chosen has blood type B?

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A4.1 The probability of an event can be defined as

a. $1 / k$ where $k$ is the number of possible outcomes and the event is one of the possible outcomes.

b. the fraction of time the event will occur if the chance experiment is repeated many times.

c. the average number of times that the event will occur in the long run.

d. the odds of the event occurring or $k$ to 1.

e. the subjective assignment of a value between 0.0 and 1.0.

A4.2 A phenomenon is random when

a. it is haphazard and its probabilities are unknown.

b. the outcome of an event is not predictable in advance but a distribution emerges in the long run.

c. its probabilities can be computed.
d. the expected value of the outcomes can be computed and has no bias.
e. all possible outcomes can be listed.

A4.3 The distribution for the number of cars owned by a randomly selected family is listed as follows:

<table>
<thead>
<tr>
<th># of cars = x</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>P(x)</td>
<td>.07</td>
<td>.21</td>
<td>.44</td>
<td>.22</td>
<td>.05</td>
<td>.01</td>
</tr>
</tbody>
</table>

What is the probability that a randomly selected family owns at least two cars?

a. .000484
b. .0968
c. .44
d. .66
e. .72
f. .93

A4.4 When you play solitaire, you either win or lose. Therefore, the probability of winning is

a. .5 because you either win or lose.
b. approximated by playing lots of times and computing the number of times you win divided by the number of times you play.
c. impossible to compute.
d. computed from the number of possible ways the deck of cards can be dealt.

A4.5 The announcer on the radio tells listeners that the probability of snow tonight is 20%. We should interpret this to mean that

a. 20% of the listeners will have snow in their area tonight.
b. you will not have any snow tonight because the chance of snow is less than 50%.
c. according to historical records when meteorological conditions were the same as today, it snowed twenty percent of the time.
d. it will snow if you are unlucky (or lucky if you like snow) and not snow if you are lucky.
1. a. 25%
   b. 1 - 25% = 75%
   c. 50% + 20% = 70%
   d. 5%
   e. 5%
   f. 5%
   g. 20% × 20% = .2 × .2 = .04 = 4%
   h. \[ 1 - P(\text{none have B}) = 1 - (.8)^5 \]
   or 100% - (80%)^5

A. 4.1 b  "many times" implies 1,000s + 1,000s of times here. See ch 16
A. 4.2 b
A. 4.3 2 or more: .44 + .22 + .05 + .01 = .72 or 72%
A. 4.4 b (see 4.1)
A. 4.5 c