

1. The customers of a particular car dealer can choose from 4 different models of car, so each customer has 4 possible choices; call them A, B, C, and D.

(3 points; 4 minutes)

- (a) Consider the choices made by the next two customers. What is the sample space for the next two choices (list the events, for example: {A,C}, but you do not need to include the braces { }). Since the choices represent different customers, {A,C} would not be the same as {C,A}.

Sample Space = set of all possible simple events

AA	BA	CA	DA
AB	BB	CB	DB
AC	BC	CC	DC
AD	BD	CD	DD

(3 points; 3 minutes)

- (b) For your sample space (above), some of the choices are more popular with customers than are others. If you pick one of the elements in your sample space at random, what is the probability that you will pick the choice that is most popular with customers?

Of the 16 elements in the sample space, only one will be the most popular. So,

$$\text{probability} = \left(\frac{1}{16} \right)$$

2. Based on the table on this page, answer the probability questions (a) through (d).

Coffee Choice	Vendor				Row Totals
	A	B	C	D	
Plain	130	123	138	128	519
Latte	40	53	73	58	224
Mocha	80	74	39	64	257
Column Totals	250	250	250	250	1000

(2 points; 3 minutes)

(a) What is the probability that a randomly selected person from those represented in the table will be one who buys coffee from Vendor C ?

$$\frac{250 \text{ buy from C}}{1000 \text{ in the table}} = 0.25 = \frac{250}{1000}$$

(3 points; 3 minutes)

(b) What is the probability that a randomly selected person from those represented in the table will be one who chooses plain or latte ?

$$P(\text{plain or latte}) = P(\text{plain}) + P(\text{latte}) + P(\text{plain and latte})$$

$$0.743 = \frac{519}{1000} + \frac{224}{1000} + \frac{0}{1000} \leftarrow \text{No overlap}$$

(4 points; 4 minutes)

(c) What is the probability that a randomly selected person from those represented in the table will be one who chooses mocha or one who buys coffee from Vendor B ?

$$P(\text{mocha or B}) = P(\text{mocha}) + P(B) - P(\text{mocha \& B})$$

$$\frac{433}{1000} = \frac{257}{1000} + \frac{250}{1000} - \frac{74}{1000} \leftarrow \text{these by mocha at B}$$

(3 points; 3 minutes)

(d) What is the probability that a randomly selected person from those represented in the table will not be someone who buys lattes from Vendor A ?

$$P(\text{not latte at Vendor B}) = 1 - P(\text{latte at Vendor B})$$

$$= 1 - \frac{53}{1000} = \frac{947}{1000} = 0.947 = 1 - 0.053$$