

**Topic:** Joint distributions

**Question:** The table shows Addie's poll of the children in her neighborhood and their cartoon watching habits. Which description comes from the joint distribution section of the table?

	< 2 hours cartoons	> 2 hours cartoons	Total
Watched on the T.V.	37%	19%	56%
Watched on a different device	7%	37%	44%
Total	44%	56%	100%

**Answer choices:**

- A The percentage of children who watched less than 2 hours of cartoons
- B The percentage of children who watched on a different device
- C The percentage of children who watched less than 2 hours of cartoons on the T.V.
- D The percentage of children who watched 2 hours or more of cartoons



**Solution: C**

The joint distribution or the joint probability distribution is the probability that a pair of events can happen. All of the possible pairs of events happen in the body of the table. For example, the percentage of children who watched less than 2 hours of cartoons on the T.V. is 37% :

	< 2 hours cartoons	> 2 hours cartoons	Total
Watched on the T.V.	37%	19%	56%
Watched on a different device	7%	37%	44%
Total	44%	56%	100%

Answer choice C is the only choice that describes a pair of events.



**Topic:** Joint distributions

**Question:** The table shows favorite activities of college students. Which description comes from the marginal distribution section of the table?

	Movie	Bowling	Pizza Party	Total
Male	8%	15%	21%	44%
Female	13%	19%	24%	56%
Total	21%	34%	45%	100%

**Answer choices:**

- A The percentage of male student who prefer movies.
- B The percentage of students who preferred a pizza party.
- C The percentage of female students in the sample.
- D Both B and C



**Solution: D**

The marginal distribution comes from the total column or total row.

Answer choices B and C are both found in the totals sections of the table.

	Movie	Bowling	Pizza Party	Total
Male	8%	15%	21%	44%
Female	13%	19%	24%	56%
Total	21%	34%	45%	100%



**Topic:** Joint distributions

**Question:** Every student at a certain high school needs to choose exactly one fine arts elective. The following frequency table shows the enrollment of electives for all students. Jessica is answering a list of questions where she needs to find distributions based off of the table below. Which question would require a conditional distribution to answer?

		Extracurricular Activities			
		Art	Architecture	Music	Total
Grade	Freshman	40	25	55	120
	Sophomore	52	12	71	135
	Junior	56	45	54	155
	Senior	30	60	20	110
Total		178	142	200	520

**Answer choices:**

- A The percentage of students who are freshman and take art.
- B The percentage of seniors enrolled in extracurricular activities.
- C The percentage of architecture students.
- D The percentage of juniors enrolled in music class of the total students enrolled in music.



**Solution: D**

Conditional distribution is calculated based on the total of the row or column. In this case we want to think of the problem as the probability of choosing a junior if we know the student is already enrolled in music.

		Extracurricular Activities			
		Art	Architecture	Music	Total
Grade	Freshman	40	25	55	120
	Sophomore	52	12	71	135
	Junior	56	45	54	155
	Senior	30	60	20	110
Total		178	142	200	520

This would be calculated by taking

$$\frac{54}{200} = 27\%$$

So 27% of the students enrolled in music class are juniors. That's why it's a conditional probability.

