

# New technologies at home



Analyse the structure of the following data carefully and then answer the questions.

**Families with computers, Internet and mobile phones at home, by type of family and quarter (%) in the Basque Country.**  
(The quarterly percentages are for the total amount of families in the Basque Country)

	Computer			Internet			Mobile phone		
	With children	With partner	Single	With children	With partner	Single	With children	With partner	Single
<b>Total (thousands)</b>	<b>348.2</b>	<b>68.3</b>	<b>56.0</b>	<b>296.3</b>	<b>54.9</b>	<b>41.9</b>	<b>421.5</b>	<b>156.7</b>	<b>150.5</b>
<b>2007</b>									
II quarter	77.4	36.6	22.8	63.0	27.1	15.2	98.5	84.1	64.3
IV quarter	80.1	37.6	24.5	65.7	29.0	17.2	98.4	86.2	67.6
<b>2008</b>									
II quarter	81.0	38.0	25.6	68.9	30.5	19.2	98.0	87.2	69.0

❖ Which variables appear in this table? What is the value for each one? Indicate whether they are quantitative or qualitative figures.

.....

.....

.....

.....

❖ How many families had a computer in the Basque Country in the second quarter of 2008?

.....

.....

❖ How many families had Internet access in the Basque Country in the second quarter of 2008?

.....

.....

❖ Is it true that nearly all families with children had mobile phones in the second quarter of 2008?

.....

.....

❖ According to the available data, do you think the use of information technology is increasing or decreasing in the Basque Country?

.....

.....

❖ Fill in the following table:

Computer						
Total in the Basque Country	With children	% with children	With partner	% with partner	Single	% Single
.....	348.2	.....	68.3	.....	56	.....

❖ Construct a similar table using the absolute and relative data on Internet access.

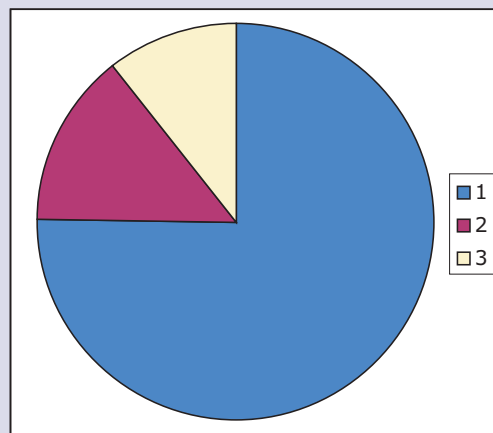
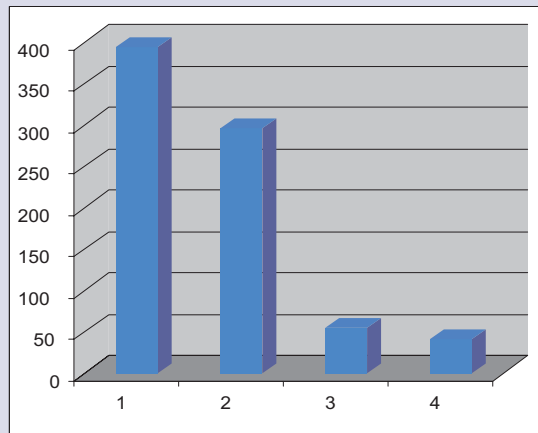
Internet						

# New technologies at home

Here are three different ways of representing the number of families with Internet access in the Basque Country in 2008.

The table shows absolute and relative (%) data. The second option is a bar diagram that uses absolute data. The third compiles relative data and is called a sector diagram or is more commonly known as pie chart.

Internet			
Basque Country	With children	With partner	Single
393.1	296.3	54.9	41.9
	75.37%	13.97%	10.66%



❖ Are the data provided by the table and the bar diagram absolute or relative? Explain why.

❖ What do the 1, 2, 3 and 4 values refer to in the bar diagram?

❖ The pie chart, as it stands, does not provide any information on the percentage for each province. Calculate these percentages and add them to the relevant parts of the pie chart.

❖ Why do you think the bar diagram has four values, while the pie chart only has three sectors?

❖ Which bar corresponds to which colour in the pie chart? Explain why.

# New technologies at home

The first thing you need to produce a diagram is data. That is why you usually start with a table to produce a graph.

Population aged 15 or over with access to a computer in the Basque Country, in 2007

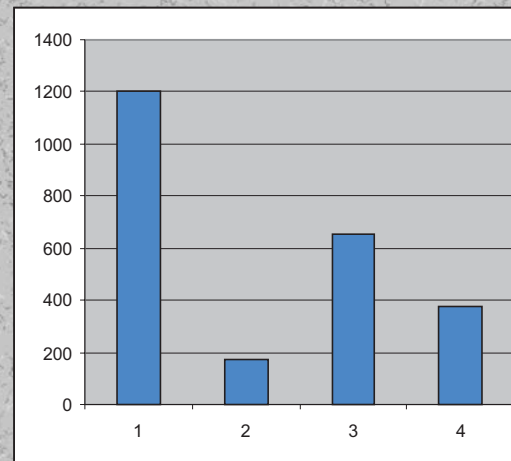
	Total population (thousands)	Computer %	Computer
<b>Total</b>	<b>1,840.0</b>	<b>65.4</b>	<b>1,203.4</b>
<b>Province</b>			
Alava	260.9	67.1	175.1
Bizkaia	992.9	65.6	651.3
Gipuzkoa	586.2	64.4	377.5
<b>Sex</b>			
Male	894.7	67.0	599.4
Female	945.3	63.9	604.0
<b>Age</b>			
Aged 15 - 24	195.8	92.7	181.5
Aged 25 - 34	329.9	79.0	260.6
Aged 35 - 44	346.3	75.6	261.8
Aged 45 - 54	310.3	80.4	249.5
Aged 55 - 64	261.5	60.5	158.2
>= 65 years	396.2	23.3	92.3
<b>Education level</b>			
Primary	569.3	35.5	202.1
Secondary	870.2	75.0	652.7
Higher	400.5	87.1	348.8
<b>Activity</b>			
Students	154.6	95.5	147.6
Employed	951.5	78.8	749.8
Inactive-Unemployed	733.9	41.7	306.0
<b>Family type</b>			
With children	1,236.6	80.0	989.3
With partner	395.5	39.4	155.8
Single	208.0	28.0	58.2

Suppose you want to create a bar diagram using the data on the use of computers in the Basque Country and each of its provinces.

These are the steps to follow using a spreadsheet:  
- Select and copy the data to be used for the table:

<b>Total</b>	<b>1,203.4</b>
<b>Province</b>	
Alava	175.1
Bizkaia	651.3
Gipuzkoa	377.5

- Open the spreadsheet and paste them, making sure that you activate the same number of cells.
- Select the data group and click on the graph button. Select the type of graph and follow the instructions until you come to "Finish".
- The image on the spreadsheet can be cut or copied and then pasted on the document you are working on. You can also print it off directly from the spreadsheet.



You should produce the same diagram as the one on your left.

This chart could be improved in several ways, such as explaining what 1, 2, 3 and 4 stand for. To do so, just go back to the spreadsheet and enter the names of the provinces over the cells with the numerical values.

Note the difference

The spreadsheet with this data can be downloaded from: <http://www.eustat.es/estad/temalista.asp?tema=132&idioma=c&opt=0>. Bear in mind that this spreadsheet contains relative, and not absolute data. Now it is your turn to complete it. Download it from the following section: Population aged 15 or over by province and socio-economical characteristics and ICT equipment in the home.

# *New technologies at home*

❖ Make a bar diagram to show Internet access by sex. Copy the data into the table, and then follow the steps on the previous page.

Sex	
Male	Female

(Bar diagram)

❖ Make a bar diagram to show Internet access by age. Copy the data into the table, and then follow the steps on the previous page.

Age	
Aged 15 - 24	
Aged 25 - 34	
Aged 35 - 44	
Aged 45 - 54	
Aged 55 - 64	
≥ 65 years	

(Bar diagram)

The first thing you need to produce a diagram is data. That is why you usually start with a table to produce a graph.

**Population aged 15 or over by province, socio-economic situation and IT equipment. 2007**

	Population (thousands)
<b>Total</b>	<b>1,203.4</b>
<b>Province</b>	
Alava	175.1
Bizkaia	651.3
Gipuzkoa	377.5
<b>Sex</b>	
Male	599.4
Female	604.0
<b>Age</b>	
Aged 15 - 24	181.5
Aged 25 - 34	260.6
Aged 35 - 44	261.8
Aged 45 - 54	249.5
Aged 55 - 64	158.2
>= 65 years	92.3
<b>Education level</b>	
Primary	202.1
Secondary	652.7
Higher	348.8
<b>Activity</b>	
Students	147.6
Employed	749.8
Inactive-Unemployed	306.0
<b>Family type</b>	
With children	989.3
With partner	155.8
Single	58.2

**Suppose you want to create a diagram using the data on Internet access by province. These are the steps to follow using a spreadsheet:**

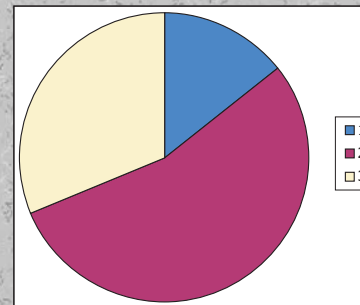
- Select and copy the data to fill out this table, except for the total.

Province	
Alava	175.1
Bizkaia	651.3
Gipuzkoa	377.5

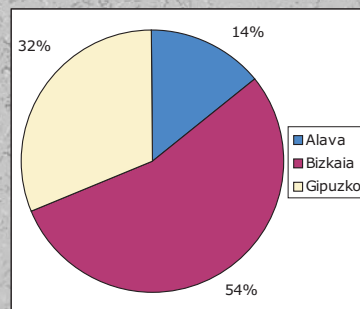
- Open the spreadsheet and copy the data, making sure that you activate the same number of cells. If you want to add the name of each province, do so in the cell above each figure.

- Select that data group and press the Graph button. Choose the type of graph you want and follow instructions until you come to "Finish".

- The image on the spreadsheet can be cut or copied and then pasted on the document you are working on. You can also print it off directly from the spreadsheet.



The graph on the left is not very detailed. You can improve it by adding more data. Now go back to the spreadsheet and work on the properties of the graph. Try to change your figures so they appear on the image below.



**Now correct the second graph using the following new values:**

**Alava 14%, Gipuzkoa 32% y Bizkaia: 54 %**

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❖ Make a pie chart to show Internet access by sex. Copy the data into the following table and then follow the steps on the previous page.

Sex	
Male	Female

(Pie chart)

❖ Make a pie chart to show Internet access by age. Copy the data into the following table and then follow the steps on the previous page.

Age	
Aged 15 - 24	
Aged 25 - 34	
Aged 35 - 44	
Aged 45 - 54	
Aged 55 - 64	
≥ 65 years	

(Pie chart)

# New technologies at home

The following data show the number of Basque citizens with IT equipment.

Families by province, type and TV or phone equipment at home.  
Annual average (%). 2007

	Total (thousands)	VCR	TV	Antenna	Pay TV	Cable	Mobile phone	Fax
<b>Total</b>	<b>798.7</b>	<b>65.4</b>	<b>82.0</b>	<b>11.1</b>	<b>19.9</b>	<b>28.5</b>	<b>87.4</b>	<b>3.6</b>
<b>Province</b>								
Alava	113.5	63.9	87.0	14.6	28.5	16.7	87.2	3.3
Bizkaia	429.5	66.8	81.6	7.4	16.7	32.1	88.2	3.8
Gipuzkoa	255.7	63.9	80.3	15.6	21.4	27.6	86.3	3.4
<b>Family type</b>								
With children	428.5	77.0	91.4	13.6	25.6	34.1	98.4	5.0
With partner	169.4	60.1	79.4	10.2	16.6	28.2	85.1	2.5
Single	200.8	45.2	63.8	6.3	10.6	16.8	65.9	1.5

Source: EUSTAT. Survey on the Information Society - ESIF

❖ Work out the total number of houses with a VCR in each Basque province. Then fill out the following bar diagram.

	Total (thousands)	VCR (%)	Thousands with VCR
<b>Basque Country</b>	<b>798.7</b>	<b>65.4</b>	.....
Alava	113.5	63.9	.....
Bizkaia	429.5	66.8	.....
Gipuzkoa	255.7	63.9	.....

❖ Work out the total number of houses with an antenna in each Basque province. Then fill out the following bar diagram.

	Total (thousands)	Antenna (%)	Thousands with antenna
<b>Basque Country</b>	<b>798.7</b>	<b>28.5</b>	.....
Alava	113.5	16.7	.....
Bizkaia	429.5	32.1	.....
Gipuzkoa	255.7	27.6	.....

❖ Prepare a pie chart for each case, preferably using a spreadsheet.

## **VCR distribution by family type**

(Table)

(Pie chart)

## **Distribution of antenna by province**

(Table)

(Pie chart)

# New technologies at home

The following table shows the number of broadband lines per 100 inhabitants in different European countries.

**Broadband access by countries and year.**  
**Annual average.**  
(Lines per 100 inhabitants. 2003-2007)

	2003	2004	2005	2006	2007
<b>EU 27</b>	:	:	:	:	<b>18.2</b>
Germany	4.8	6.7	10.2	15.3	21.1
Austria	6.6	8.7	11.6	15.8	18.4
Belgium	10.1	14.0	17.4	20.7	23.9
Bulgaria	:	:	:	:	5.7
Cyprus	:	2.0	2.7	6.6	11.1
Denmark	10.4	15.6	22.0	29.6	37.2
Slovakia	:	0.4	1.5	4.0	6.9
Slovenia	:	3.8	7.8	11.4	15.3
Spain	4.3	6.7	10.0	13.2	16.8
Estonia	:	7.6	11.1	16.6	20.0
Finland	6.6	11.0	18.7	24.9	28.8
France	4.0	8.2	13.9	18.0	22.3
Greece	0.0	0.2	0.8	2.7	6.8
Netherlands	9.8	14.7	22.4	29.0	33.1
Hungary	:	2.2	4.5	7.5	11.6
Ireland	0.2	1.7	4.4	8.8	15.5
Italy	2.8	6.1	9.5	13.1	15.9
Latvia	:	1.5	3.7	6.8	11.6
Lithuania	:	2.5	5.0	8.4	12.7
Luxembourg	2.3	5.7	11.7	17.4	24.6
Malta	:	3.5	10.4	12.8	13.9
Poland	:	0.5	1.9	3.9	6.8
Portugal	3.6	6.4	10.1	12.9	14.8
United Kingdom	3.7	7.4	13.5	19.2	23.8
República Checa	:	0.7	4.3	8.4	12.2
Romania	:	:	:	:	6.6
Sweden	8.6	12.1	17.1	22.9	28.3
<b>Basque Country</b>	<b>3.8</b>	<b>6.7</b>	<b>10.0</b>	<b>14.7</b>	<b>18.7</b>
-Alava	3.0	5.8	9.5	14.0	18.5
-Bizkaia	3.5	6.3	9.4	15.1	18.7
-Gipuzkoa	4.5	7.9	11.3	14.5	19.0

(:) No data available

❖ Prepare a table using the 2007 data for *Germany, Spain, Romania and Basque Country*, then produce a diagram that compares the evolution of each country. Comment on the graph.

(Table)

(Diagram)

Comment on the graph:

.....

.....

.....

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.....

# New technologies at home

❖ Look at the data on the previous page and fill out a table using the 5-year data for Gipuzkoa. Then use the table to produce a diagram and comment on its evolution.

(Table)

(Diagram)

Comment on its evolution:

.....  
.....  
.....  
.....  
.....  
.....  
.....

❖ Look at the data on the previous page carefully and answer the questions.

1/ By what percentage did broadband increase in Germany between 2006 and 2007?

.....  
.....  
.....

2/ Was the percentage increase higher in Slovenia or in France?

.....  
.....  
.....

3/ In which Basque province was there the greatest increase in broadband use between 2005 and 2007?

.....  
.....  
.....

4/ Choose a country where you think the increase between 2003 and 2005 exceeded 400%. Justify your answer.

.....  
.....  
.....  
.....  
.....  
.....  
.....

# New technologies at home

## SURVEY ON THE INFORMATION SOCIETY: FAMILIES

2nd quarter 2008

*One out of every two people aged 15 and over uses Internet in the Basque Country*

*That figure rises to nine out of ten for the 15-24 age bracket*

In the second quarter of 2008, the number of people aged 15 and over who used Internet in the Basque Country stood at 908,700, 49.3% of the Basque population within that age bracket, according to Eustat data. This percentage was up 4.1% on the fourth quarter of 2007.

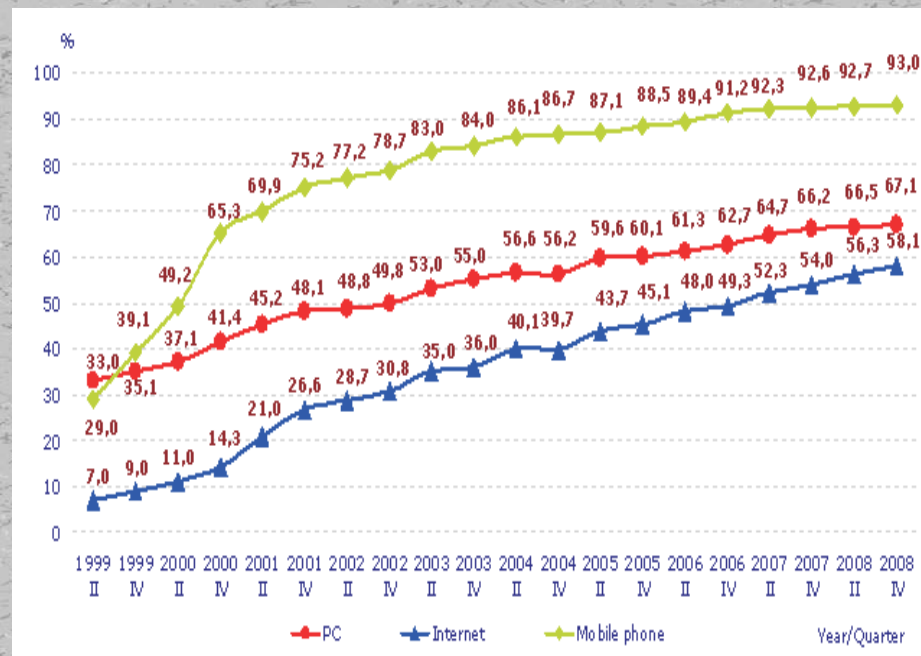
By province, the largest increase in the number of users was in Gipuzkoa, up 7.5% on the fourth quarter of 2007, and it also had the highest percentage of Internet users. Alava was up by 5% and accounted for 49.7% of Internet users in the last quarter. The figure for Bizkaia rose by 1.9%, up to 48.7% of the population aged 15 and over.

Nine out of ten of people between 15 and 24 use Internet.

In terms of age, 91% of people between 15 and 24 used Internet in the last three months, 1.2% down on the fourth quarter of 2007. There was a remarkable 38% increase of users between 55 and 64 years old, although the total number for that age bracket was low (only 4.5% of the population).

Source: [http://www.eustat.es/elem/ele0004700/not0004774\\_i.html](http://www.eustat.es/elem/ele0004700/not0004774_i.html)  
(You will find a press release exactly like this or updated)

Evolution of people aged 15 and over by access to IT equipment at home, by quarter. 1999-2008. %



Source: EUSTAT

1/ Can you use the available data to estimate the total amount of people aged 15 and over in the Basque Country?

.....

.....

2/ Calculate the increase in the number of people using PCs between the 2nd and 4th quarters of 2002?

.....

3/ Which year saw the biggest increase of people aged 15 and over with a mobile phone? Calculate by how many?

.....

.....

4/ Work out the difference between the number of people with a mobile phone and the number of people with Internet in late 2007.

.....

# New technologies at home

Carefully read the following data on Internet use in the Basque Country.

	Basque Country	Alava	Bizkaia	Gipuzkoa
<b>Total</b>	<b>1,840.0</b>	<b>260.9</b>	<b>992.9</b>	<b>586.2</b>
<b>Possibility of access (*)</b>				
At home	978.6	144.7	527.2	306.6
At work	406.4	51.3	225.2	129.8
At school	122.7	15.2	67.2	40.4
Somewhere else	45.7	5.1	23.5	17.2
<b>Internet users</b>	<b>858.4</b>	<b>119.0</b>	<b>467.4</b>	<b>272.0</b>
<b>Place of access (*)</b>				
At home	685.4	101.5	376.9	207.0
At work	374.0	44.8	204.2	125.0
At school	109.0	13.1	58.2	37.7
Somewhere else	73.1	6.6	46.3	20.2
<b>Main aim of connection</b>				
Professional	265.1	27.8	134.6	102.7
Academic	41.0	5.3	19.2	16.5
Personal	448.3	85.7	210.1	152.5
Others	104.0	0.3	103.5	0.2
<b>Main days of access</b>				
Work days	366.5	44.4	177.6	144.6
Holidays	70.4	12.6	38.6	19.2
No difference	421.5	62.1	251.2	108.2

(\*) Multiple choice question

This information is available as a spreadsheet from:  
<http://www.eustat.es/estad/temalista.asp?tema=133&idioma=i&opt=0>; under the name: "Population aged 15 or over by their relation to the Internet and province (Thousand). 2007 (You will find a table exactly like this or updated)



❖ Produce a bar diagram to show "Possibility of access" in the Basque Country. Start by filling out this table, preferably on a spreadsheet. Do not forget to include a percentage and name for each value.

	Basque Country
<b>Possibility of access</b>	
At home	.....
At work	.....
At school	.....
Somewhere else	.....

(Bar diagram)

# New technologies at home

❖ Produce a bar diagram to show "Place of access" in the Basque Country. Start by filling out this table, preferably on a spreadsheet. Do not forget to include a percentage and name for each value.

	Basque Country
<b>Place of access</b>	
At home	.....
At work	.....
At school	.....
Somewhere else	.....

(Bar diagram)

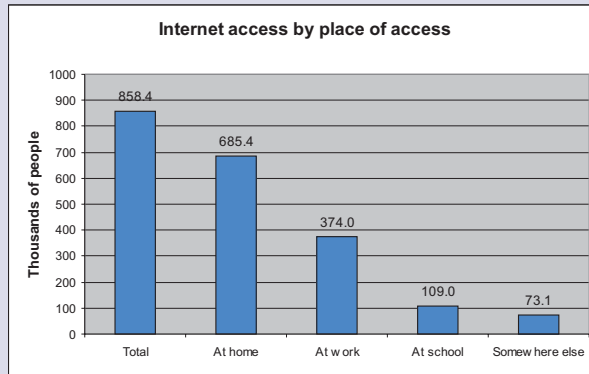
❖ Produce a bar diagram to show "Main aim of connection" in the Basque Country. Start by filling out this table, preferably on a spreadsheet. Do not forget to include a percentage and name for each value.

	Basque Country
<b>Main aim of connection</b>	
Professional	.....
Academic	.....
Personal	.....
Others	.....

(Bar diagram)

# New technologies at home

The following bar diagram shows the number of people aged 15 and over (in thousands) with Internet access in the Basque Country, as well as the most usual place of access.



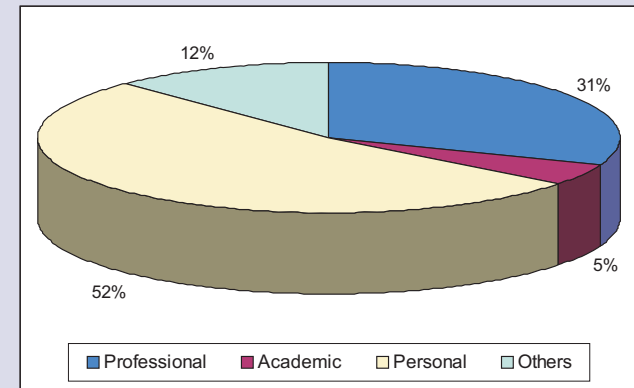
This information is taken from:  
<http://www.eustat.es/estad/temalista.asp?tema=133&idioma=i&opt=0>  
(You will find an information exactly like this or updated)

❖ Process a pie chart for the "Place of access" in the Basque Country. Start by making a table. Bear in mind that some people use Internet at home as well as at work or school, so the total number of users does not equal the sum of each location.

(Table)

(Pie chart)

This pie chart shows the percentage of each type of Internet use.



This information is taken from:  
<http://www.eustat.es/estad/temalista.asp?tema=133&idioma=i&opt=0>  
(You will find an information exactly like this or updated)

❖ Given that the total number of users (in thousands) is 1,840, produce a bar diagram to represent the data.

(Table)

(Bar diagram)

# New technologies at home

Carefully read the following press release. This is data for Internet use in the fourth quarter of 2006.

The number of people aged 15 and over who use Internet in the Basque Country was 766,400 in the last quarter of 2006, 41.6% of the total population for that age, according to Eustat data. This percentage represented a 1.5% increase compared to the second quarter of the same year and a 10.9% increase on the previous year.

By province, the greatest increase in the number of users was in Bizkaia, 4% compared to the second quarter of 2006, and it was the second province with the largest percentage of Internet users (41.5%). Gipuzkoa remained in first place (42.8%), a 1% increase on the second quarter of 2006. The number of Internet users fell in Alava by 2.7%, with 39.4% of the population aged 15 and over.

Source: [http://www.eustat.es/elem/ele0004100/not0004165\\_i.html](http://www.eustat.es/elem/ele0004100/not0004165_i.html)  
(You will find a press release exactly like this or updated)

❖ Produce a pie chart to show the percentage of users by province for the 2nd and 4th quarters of 2006.

Start by making a table, preferably on a spreadsheet. Do not forget to include a percentage and name for each value.

(2nd quarter of 2006)

(Pie chart)

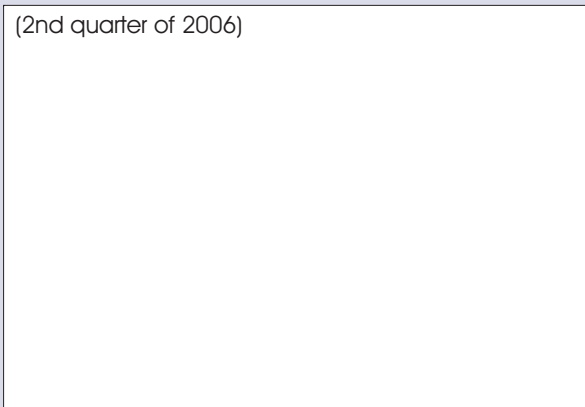
(4th quarter of 2006)

(Pie chart)

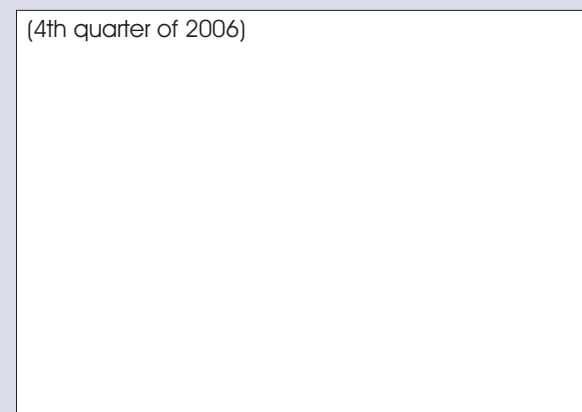
# *New technologies at home*

- ❖ Produce a point diagram for the total number of users by province for the 2nd and 4th quarters of 2006. Start by making a table, preferably on a spreadsheet. Do not forget to include a percentage and name for each value.

(2nd quarter of 2006)



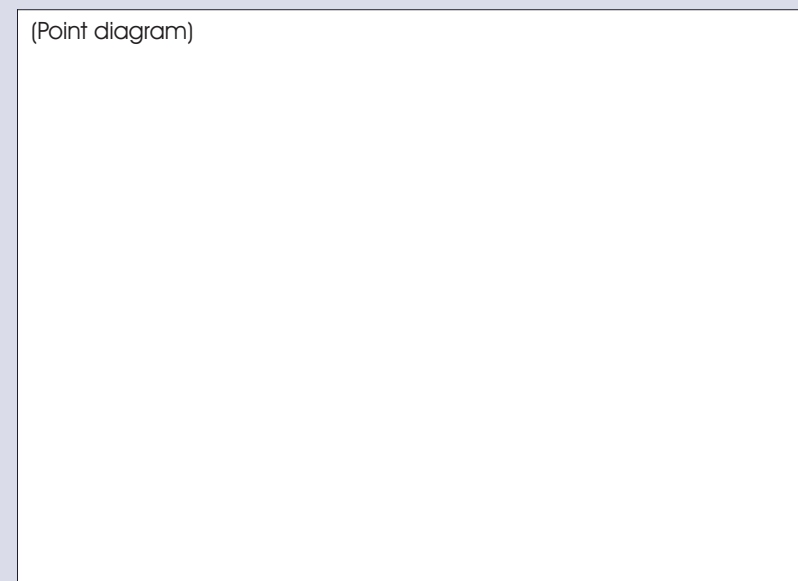
(4th quarter of 2006)



(Point diagram)



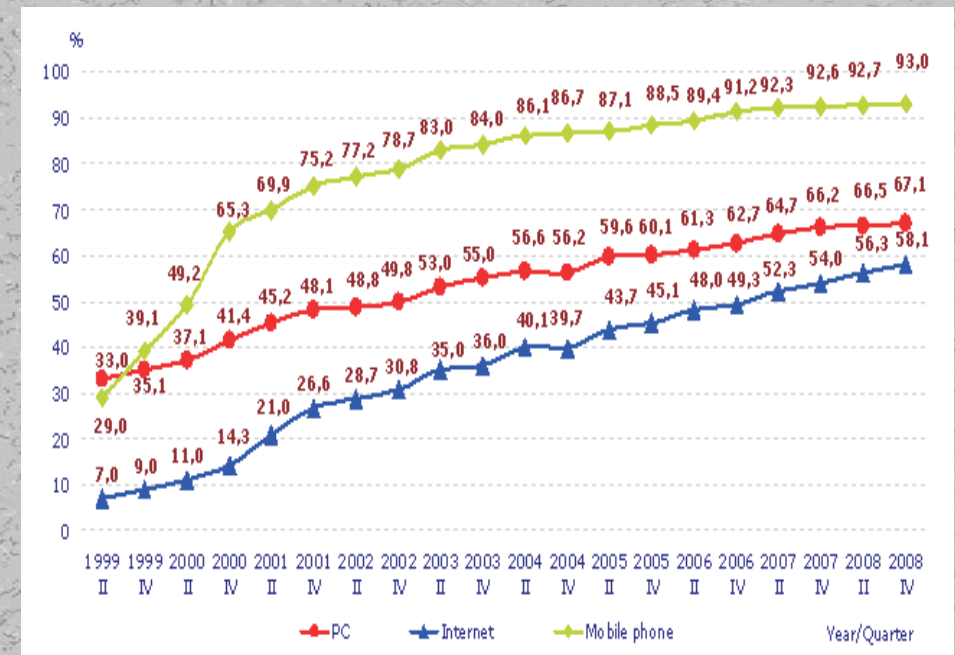
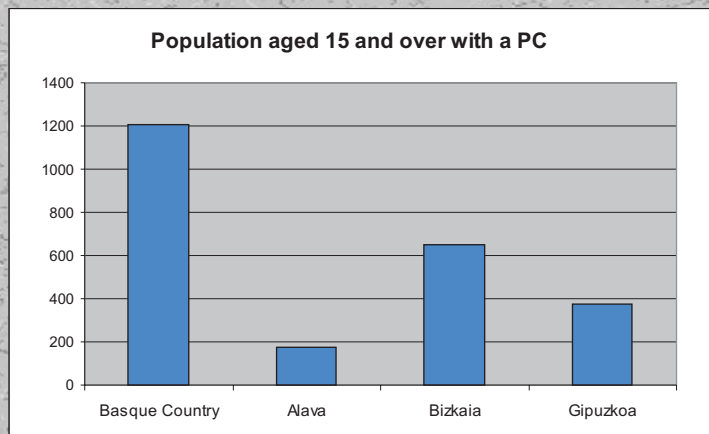
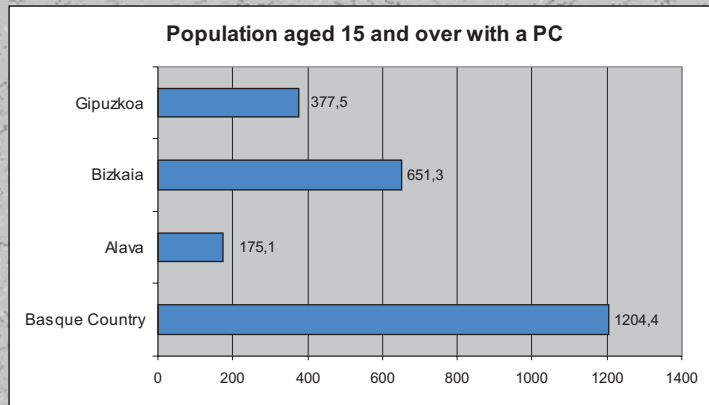
(Point diagram)



Diagrams are graphics that represent statistical data. There are many types of diagrams, but most can be divided into two types:

- a) Those that represent absolute data: bar diagrams, point diagrams, line diagrams...
- b) Those that represent percentages: sector diagrams, also called pie charts.

## DIAGRAMS REPRESENTING ABSOLUTE DATA



## DIAGRAMS REPRESENTING RELATIVE DATA O PERCENTAGES

Pie charts represent relative data or percentages. The usual method to produce this type of diagram is to use tools built into word processors, spreadsheets and other, similar programs.

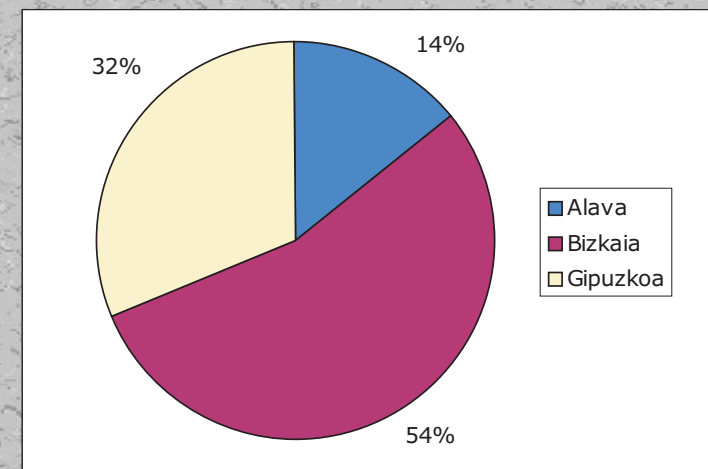
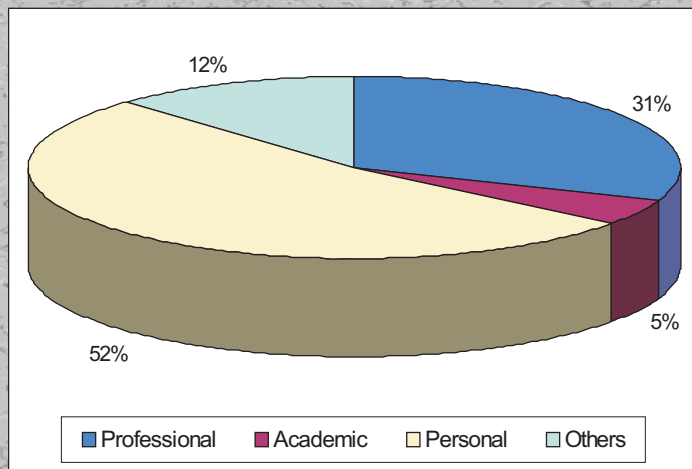
If you want or need to perform the calculation without using these programs, these are the steps to follow:

- Find out, if you already have not, the percentage you want to represent. Let us call this value "a".
- Draw a circle and set a central angle corresponding to:

Central angle, corresponding to the "a" percentage =  $(a * 360) / 100$

Thus, the angle would be =  $(40 * 360) / 100 = 144^\circ$  for a percentage of 40%.

Follow the same steps for the other values.



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+ Select the data you need from this table and produce the appropriate bar diagram.

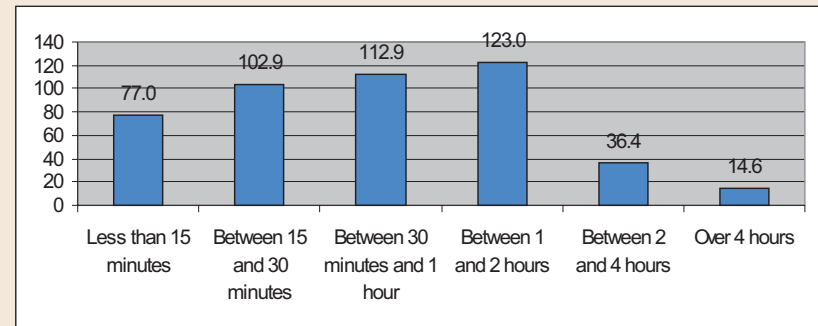
**Duration of last access**

Less than 15 minutes	123.0
Between 15 and 30 minutes	102.9
Between 30 minutes and 1 hour	112.9
Between 1 and 2 hours	77.5
Between 2 and 4 hours	36.4
Over 4 hours	14.6

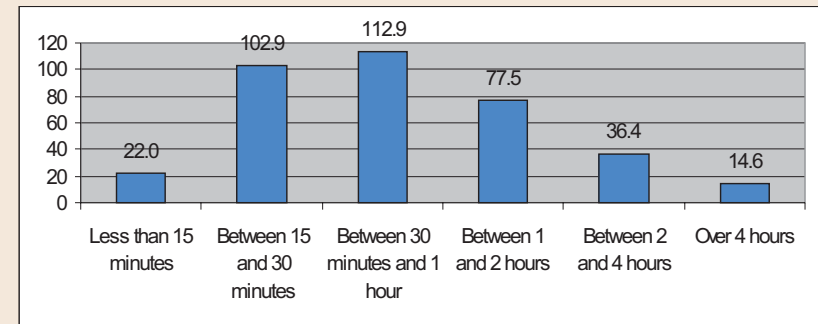
1/ The correct diagram is:

- A
- B
- C

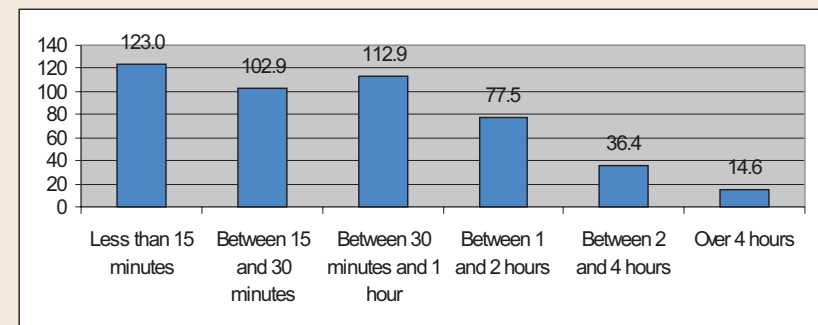
A



B

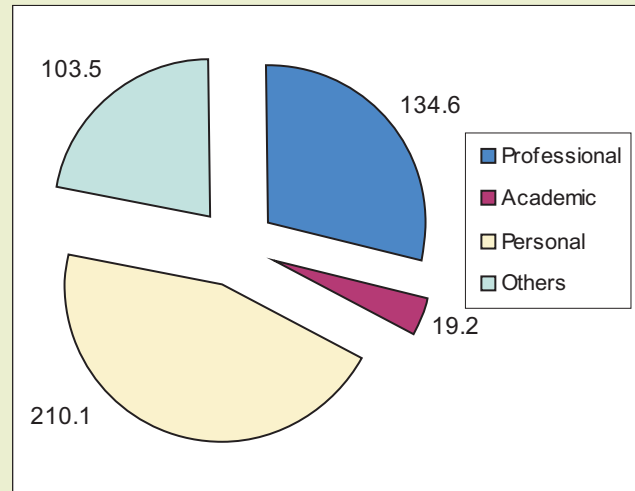


C



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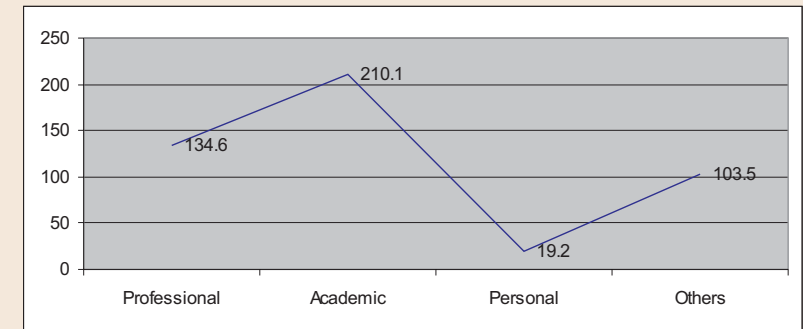
+ Which line diagram corresponds to this pie chart representing reasons for Internet access?



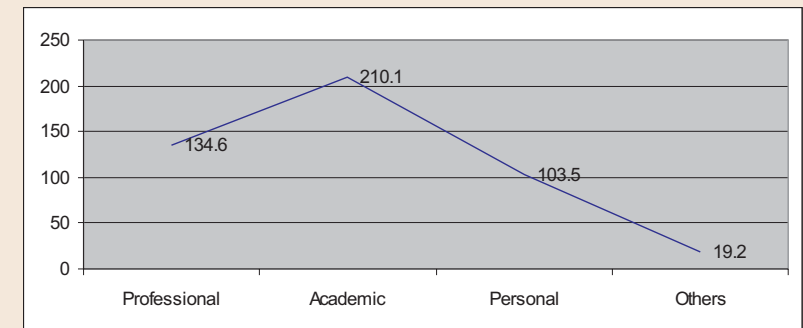
2/ The correct diagram is:

- A
- B
- C

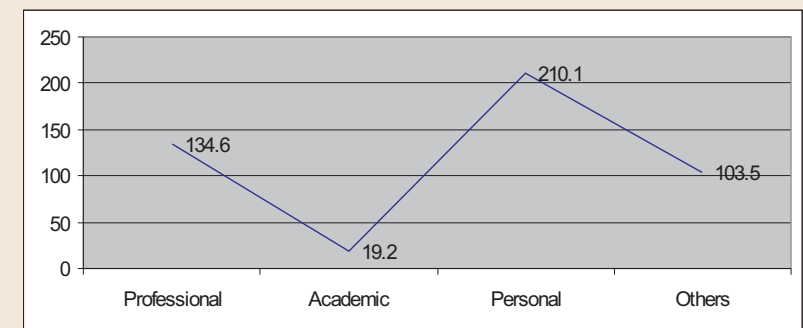
A



B



C



+ Which central angle corresponds to 45% in a pie chart?

- 3/      a)  $120^\circ$                       b)  $150^\circ$   
          c)  $162^\circ$                       d)  $170^\circ$

+ The following results were obtained after 45 people were asked about their favourite colour:

Blue	8
White	6
Black	5
Yellow	9
Green	10
Red	7

4/ Which one is the central angle for the colour yellow if you decide to make a pie chart?

- a)  $72^\circ$                               b)  $90^\circ$   
c)  $45^\circ$                               d)  $80^\circ$

5/ Which value will have a central angle of  $80^\circ$ ?

- a) Blue                                b) Black  
c) Yellow                              d) Green

+ According to our data, 60% of people who use Internet regularly are men. Which central angle of a pie chart would correspond to "women"?

- 6/      a)  $144^\circ$                               b)  $180^\circ$   
          c)  $120^\circ$                               d)  $90^\circ$

+ After asking 80 people about their favourite colour, the central angle of the pie chart for the "blue" value is  $72^\circ$ . The number of answers for that value is:

- 7/      a) 20                                      b) 72  
          c) 16                                    d) 14



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Test solutions:

- 1. c
- 2. c
- 3. c
- 4. a
- 5. d
- 6. a
- 7. c
- 8. b
- 9. a
- 10. d