

Business Statistics & Presentation of Data

BASIC MATHEMATICS
MATH0101

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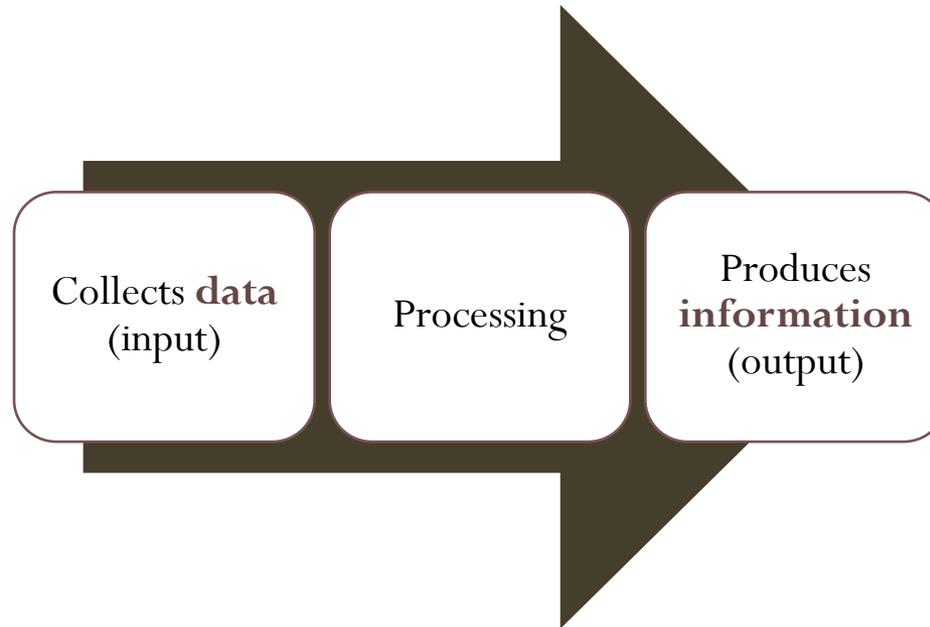
STATISTICS ???

- Numerical facts –
eg. the number of people living in a certain town, or
the number of cars using a traffic route each day
- The study of ways of collecting and interpreting
these facts

Why We Needs to Know about Statistics

- To know how to properly present information
- To know how to draw conclusions about populations based on sample information
- To know how to obtain reliable forecasts

Data vs Information



Data are the raw materials for data processing.
Information is data that has been processed

Collecting Data

- Data can be collected in a number of ways

Eg: monthly reports from all their departments on such matters as sales, purchases, capital expenditure, wages paid, staff employed, and so on.

- Can then be used to **compare actual performances with planned performances**, and **adjustments** may be made in order to achieve better results.

A visual display in the form of a chart

- Charts often convey the meaning or significance of data **more clearly** than would a table.
- Line graph
- Bar charts
- Histograms
- Ogives
- Pie charts

Tally Charts

- A table used to record values for a variable in a data set
- One tally mark is used for each occurrence of a value.
- Tally marks are usually grouped in sets of five, to aid the counting of the frequency for each value.

<http://www.brainpopjr.com/math/data/tallychartsandbargraphs/>

- The number of days in a week that rain fell in Grey Lynn, Auckland, from Monday 2 January 2006 to Sunday 31 December 2006 is recorded in the tally chart below.

Number of days with rain	Number of weeks
0	
1	
2	
3	
4	
5	
6	
7	

Title: How Do We Get to School?

Categories	Tallies	Total
Walk	 	7
Bike		3
Car		4
Bus	 	12

Color	Tally	Number
Red		
Green		
Pink		
Orange		
Purple		
Blue		

Pictograms

- A pictogram is a form of graphical presentation where repetitions of a picture are used to represent frequencies or other values of a feature.

Day	Number of apples sold
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

Key:  = 2 apples

represents 2 cars



RED



BLUE



GREEN



BLACK



WHITE

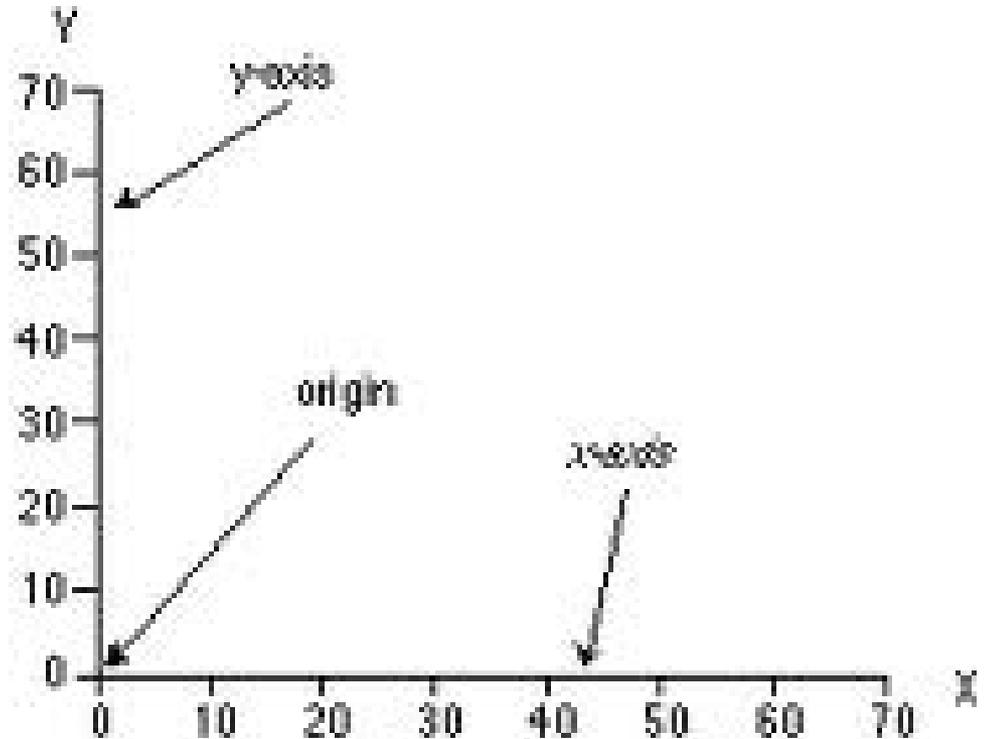


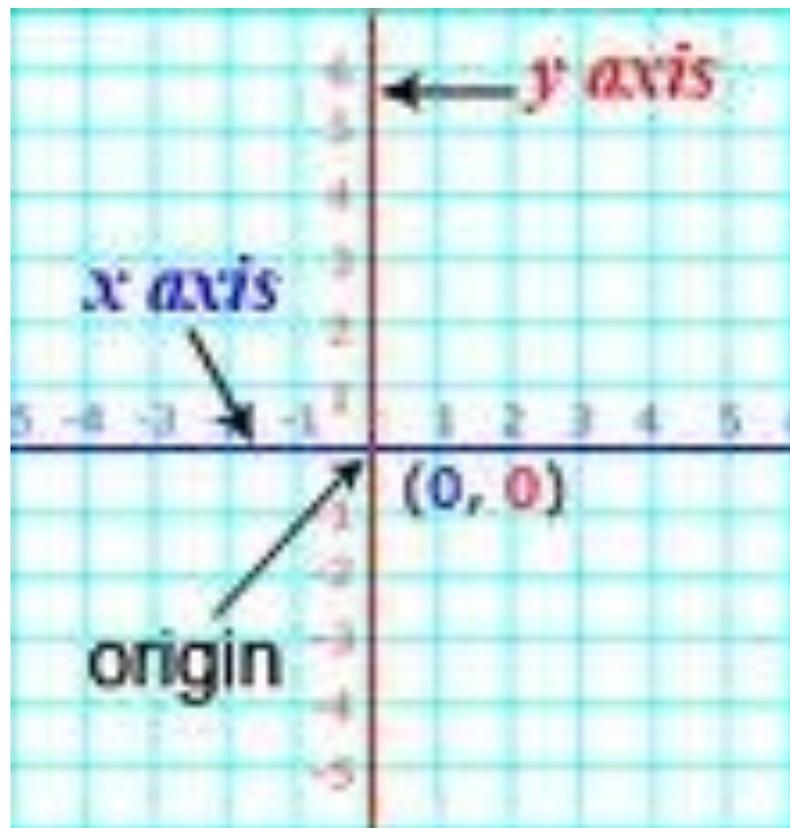
OTHER



GRAPH

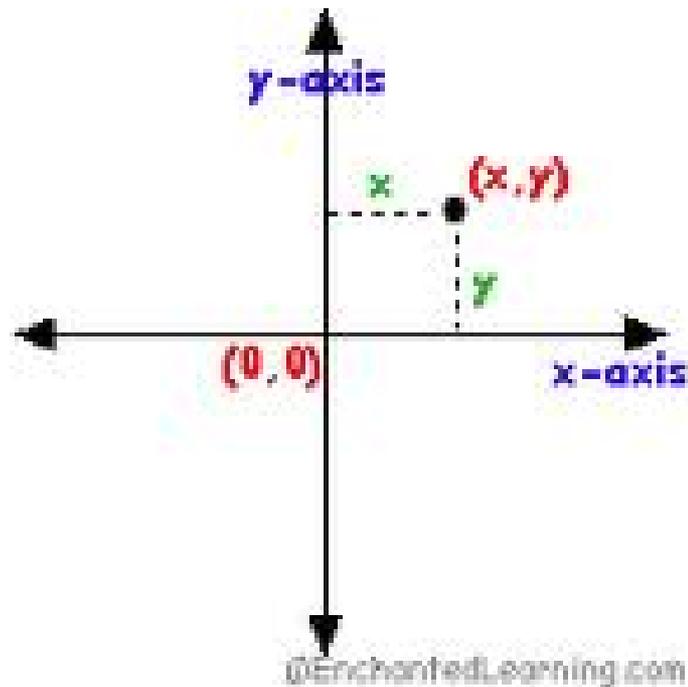
- Shows relationships between 2 variables, x and y
- 2 axes : Horizontal (x), and Vertical (y)
- Point where the 2 axes intersect is called the *origin* $(0,0)$.



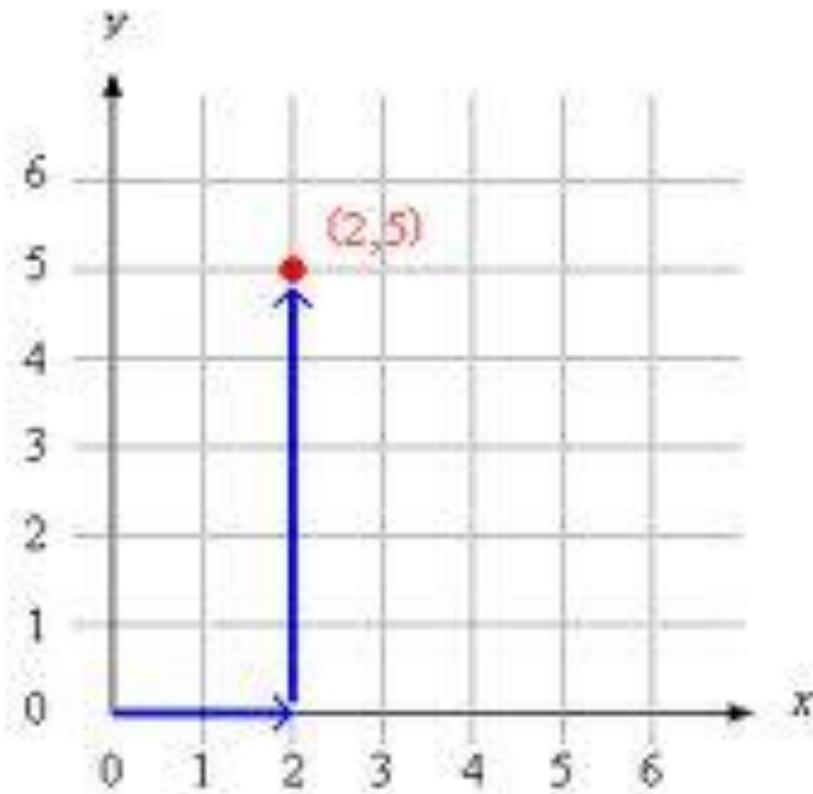


Coordinates of points

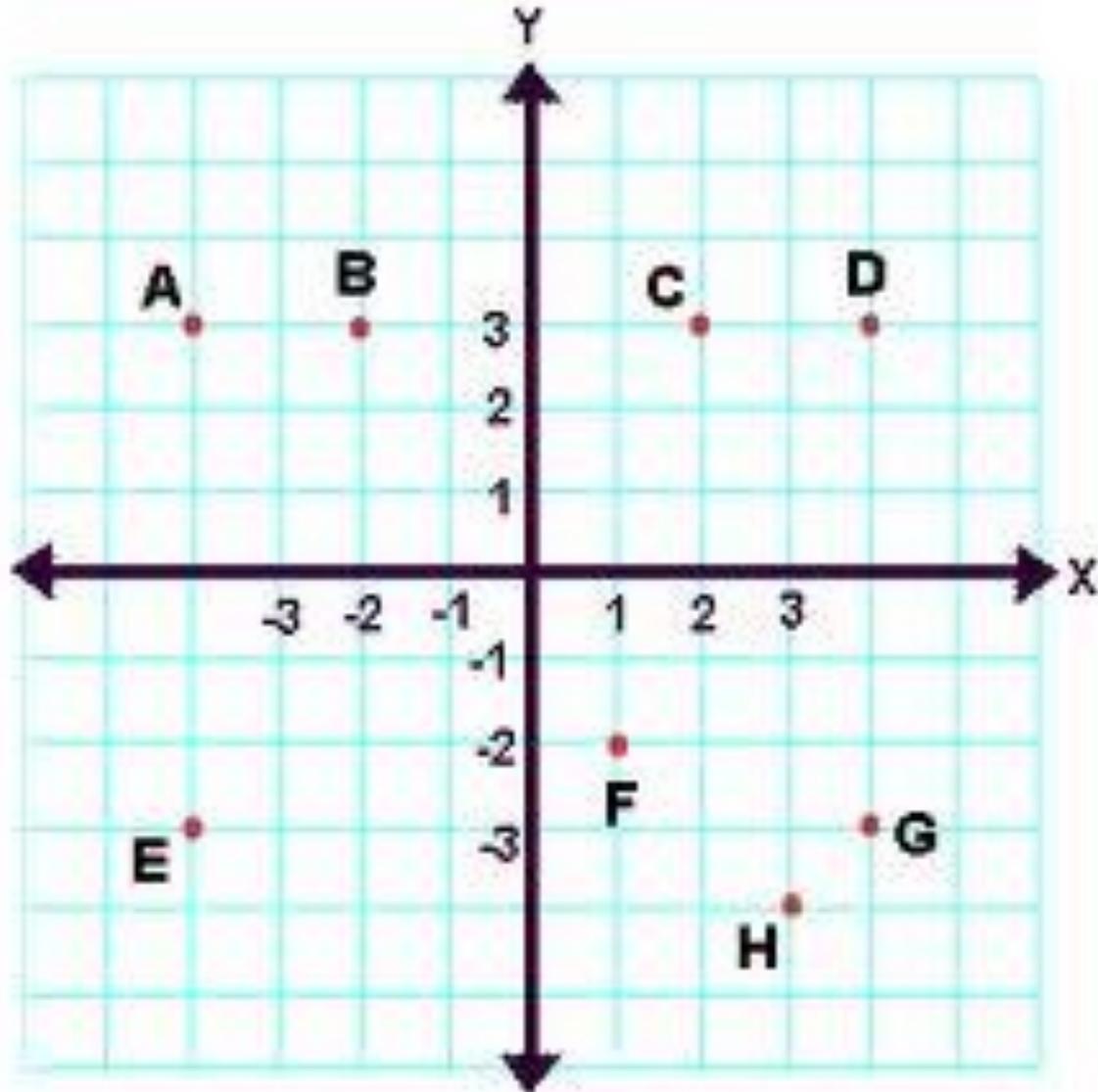
- Is one of a set of numbers used to identify the location of a point on a graph.
- Coordinate: (x,y)



Plot point (2 5)



TRY· Find the coordinate

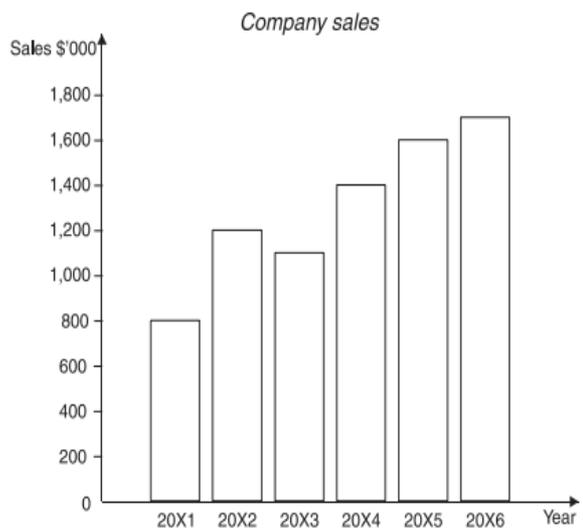


Bar charts

- ⦿ A method of data presentation in which data are represented by
 - ⦿ bars of **equal width**,
 - ⦿ the height / length of the bar corresponding to the value of the data.
- ⦿ Axes must be **labeled** and there must be a scale to indicate the magnitude of the data.

Simple

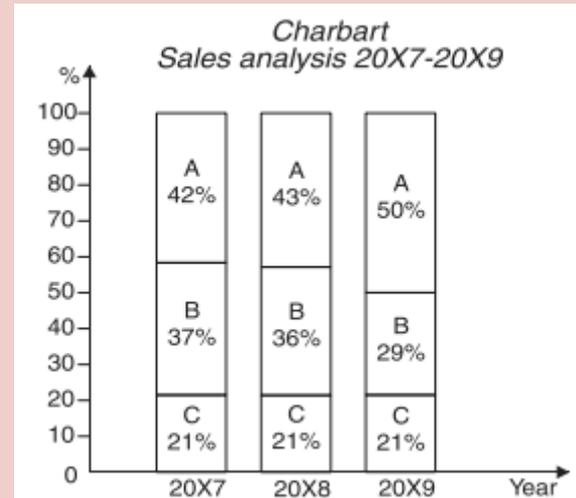
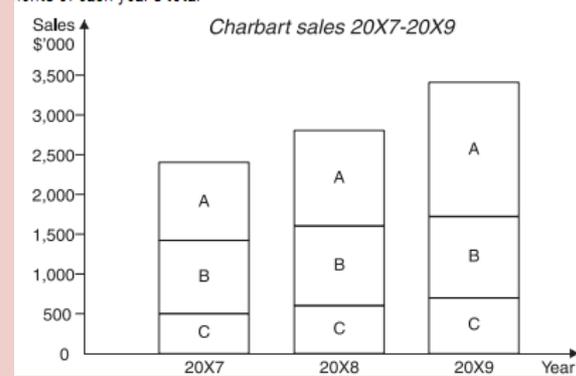
- A chart consisting of **one or more bars**
- The **actual magnitude** of each item is shown
- The lengths of bars on the chart allow magnitudes to be compared



Component

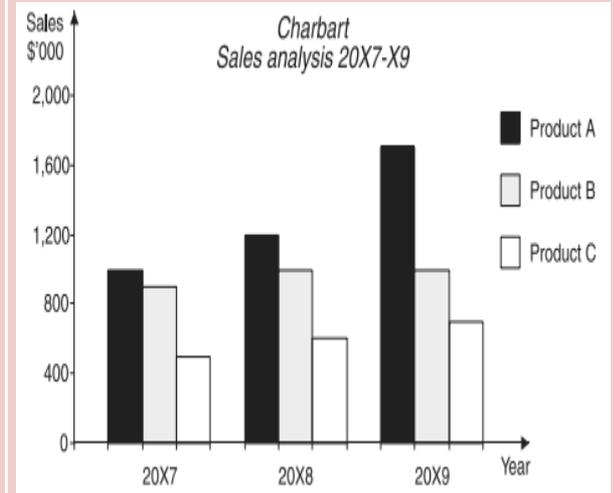
A bar chart that gives a **breakdown of each total into its components**.

A **percentage component** = does not show total magnitudes



Compound

- **two or more separate bars** are used to present **sub-divisions** of data.
- There is usually **no space** between the bars for data in the same category



Pie charts

- ⊙ A chart which is used to show **pictorially** the **relative size** of component elements of a total. (always be based on percentage values)
- ⊙ A complete 'pie' = $360^\circ = 100\%$
 $180^\circ = 50\%$
- ⊙ **Shading** and **Colour** => distinguishes the segments from each other

Example

Given : Sales of furniture (£'000)

Settees 34

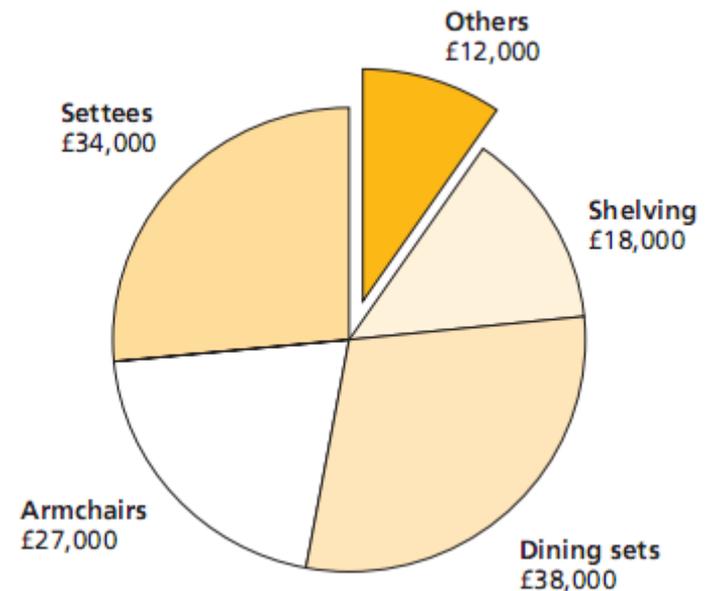
Armchairs 27

Dining sets 38

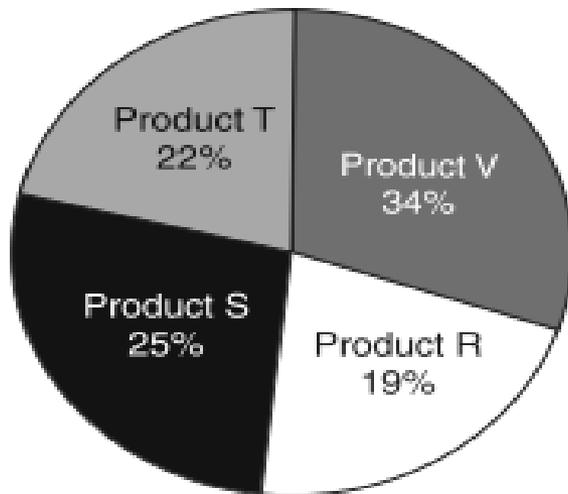
Shelving 18

Others 12

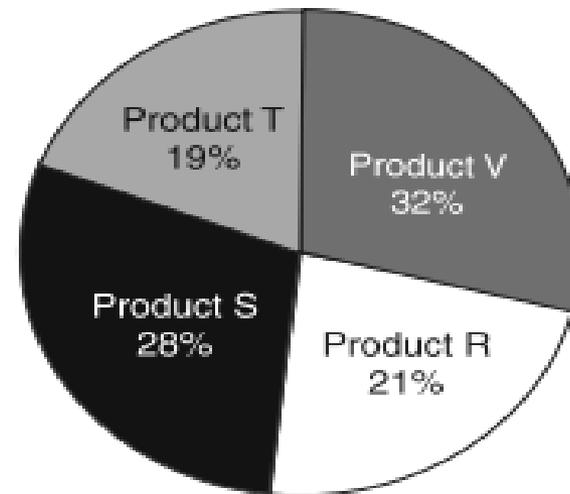
Category	Sales	Angle, °
Settees	34	95
Armchairs	27	75
Dining sets	38	106
Shelving	18	50
Others	12	34
Total	129	360



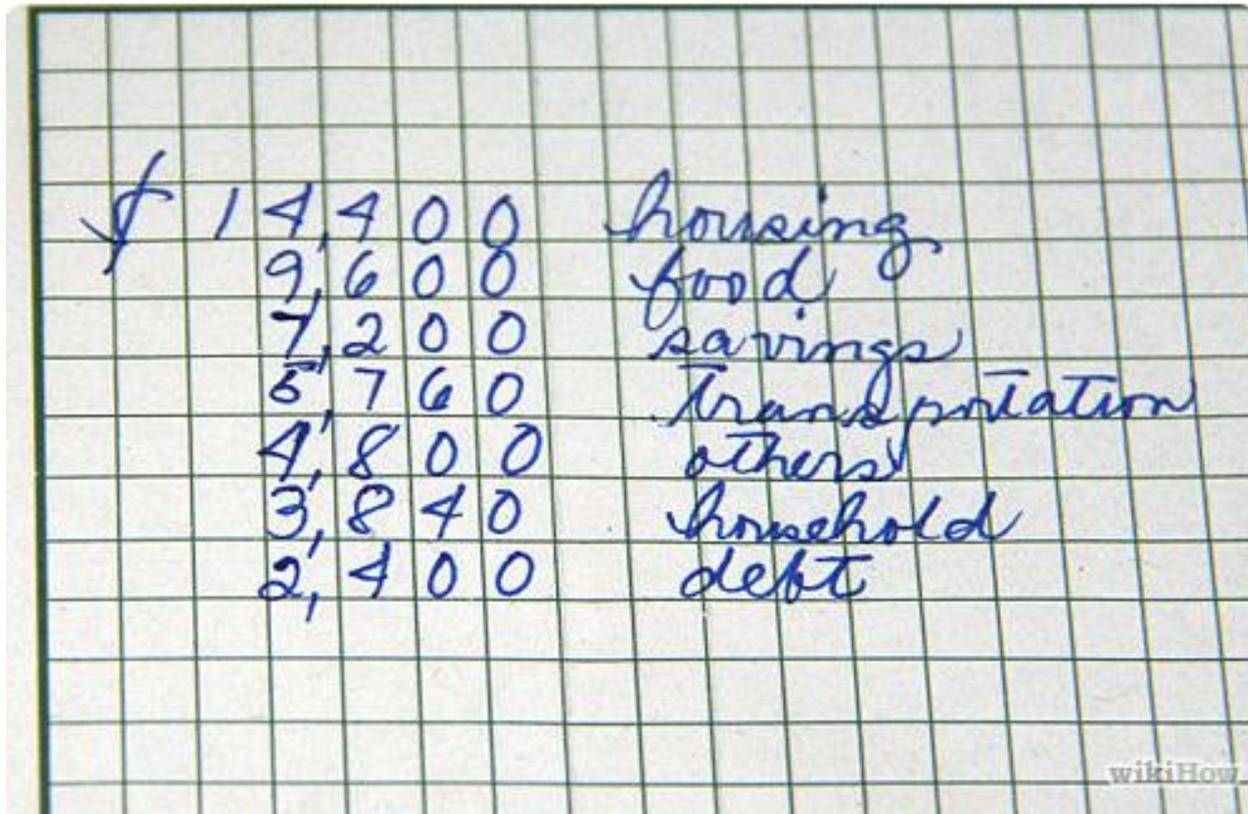
20X0



20X1



1. **Organize your information.** Gather your data/info and write it down in one place.



A photograph of a piece of grid paper with handwritten notes in blue ink. The notes are organized into a list of categories with corresponding numerical values. The categories are: housing, food, savings, transportation, others, household, and debt. The values are: \$14,400 for housing, 9,600 for food, 7,200 for savings, 5,760 for transportation, 4,800 for others, 3,840 for household, and 2,400 for debt. A 'wikiHow' watermark is visible in the bottom right corner of the grid paper.

\$	14,400	housing
	9,600	food
	7,200	savings
	5,760	transportation
	4,800	others
	3,840	household
	2,400	debt

2. **Add it all together.** Sum your data from Step 1. When you're figuring out degrees later, this number will be your denominator.

A handwritten table on grid paper listing various expenses and their total. The table is organized into two columns: monetary values on the left and category names on the right. The values are aligned to the right, and a horizontal line is drawn under the second-to-last row. The total value is written below the line.

\$ 14,400	housing
9,600	food
7,200	savings
5,760	transportation
4,800	others
3,840	household
2,400	debt
<hr/>	
\$ 48,000	Total

wikiHow

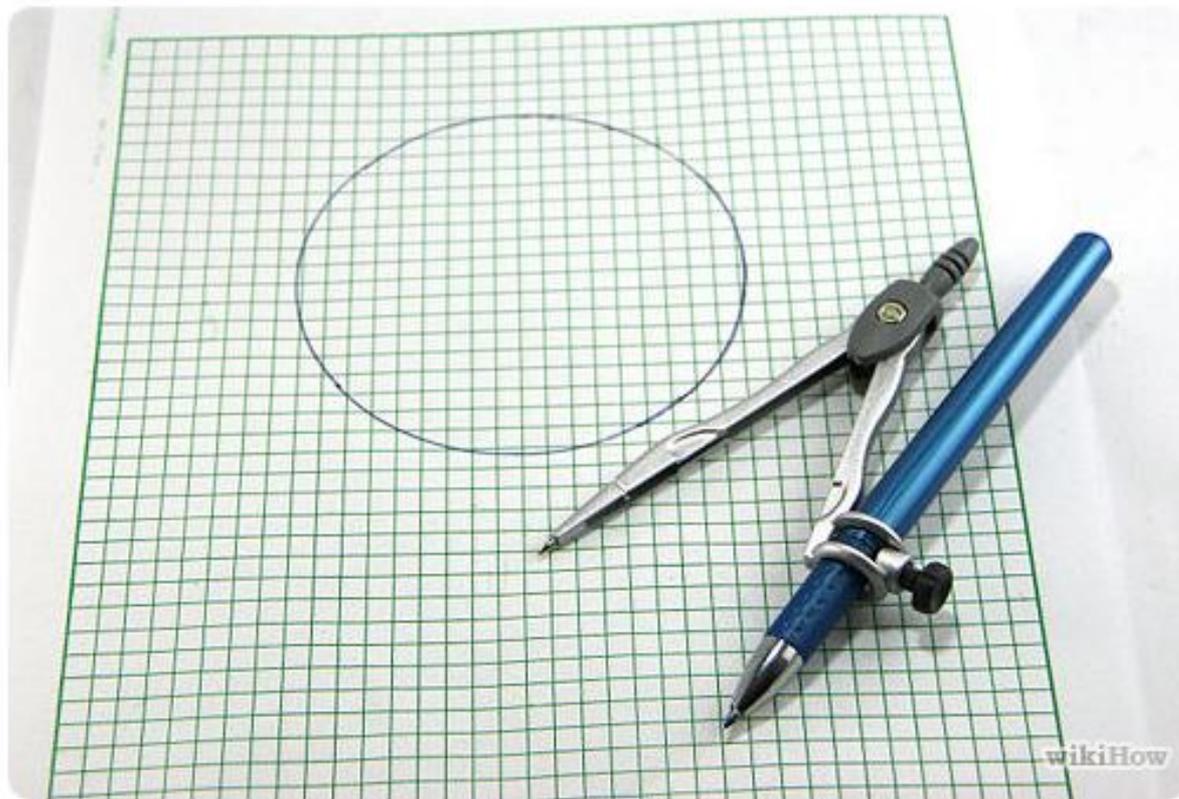
3. know the angle between the two sides of the piece.
To do so, multiply your percentage (still in decimal form) by 360.

- The logic behind this is that there are 360 degrees total in a circle. If you know that 14,400 is 30 percent of the whole (or 0.30), then you're just trying to figure out what 30% of 360 is.
- Add up all the degrees you calculate from this step. They should equal 360. If they don't, you've missed something.

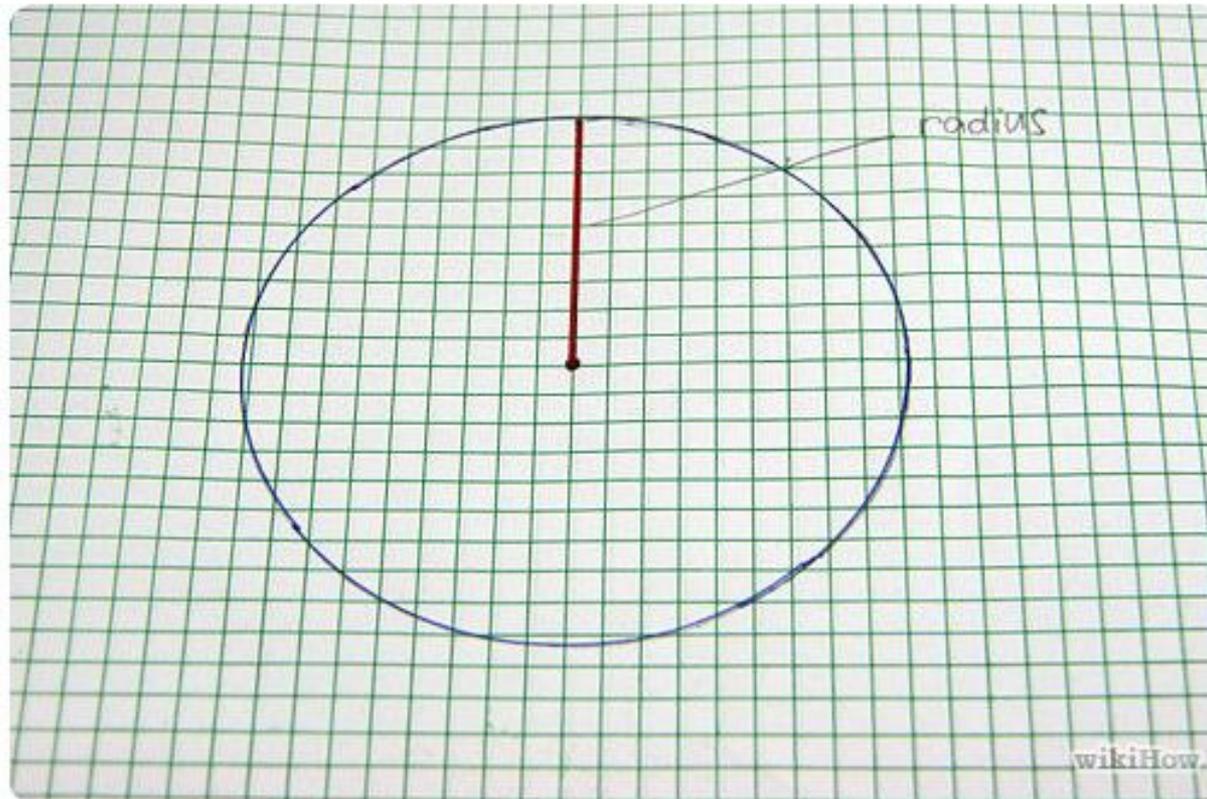
A photograph of a piece of grid paper with handwritten calculations in blue ink. The calculations show the conversion of various percentages to degrees by multiplying the decimal form of the percentage by 360. The results are listed in a column on the right. A 'wikiHow' watermark is visible in the bottom right corner of the grid paper.

Percentage	Decimal	Operation	Result (Degrees)
30%	0.3	$\times 360$	108
20%	0.2	$\times 360$	72
15%	0.15	$\times 360$	54
12%	0.12	$\times 360$	43
10%	0.1	$\times 360$	36
8%	0.08	$\times 360$	29
5%	0.05	$\times 360$	18

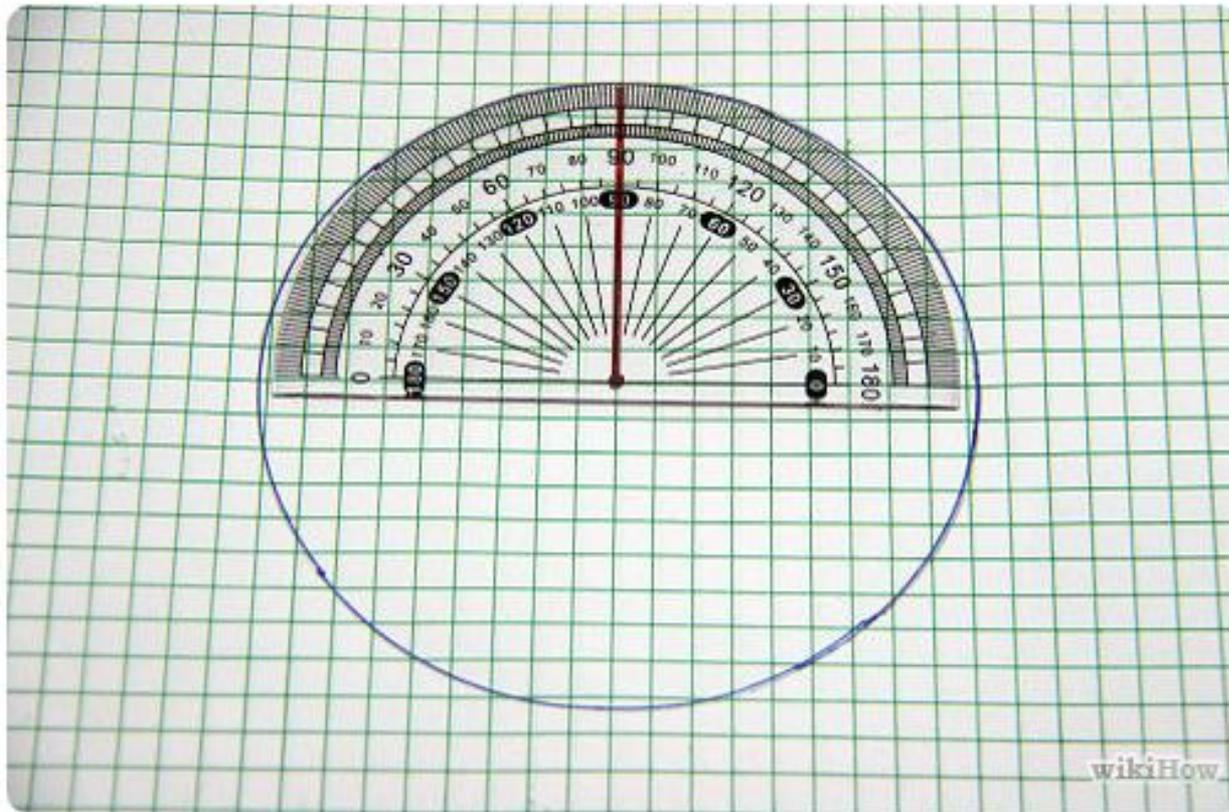
4. Use a mathematical compass to draw a circle.

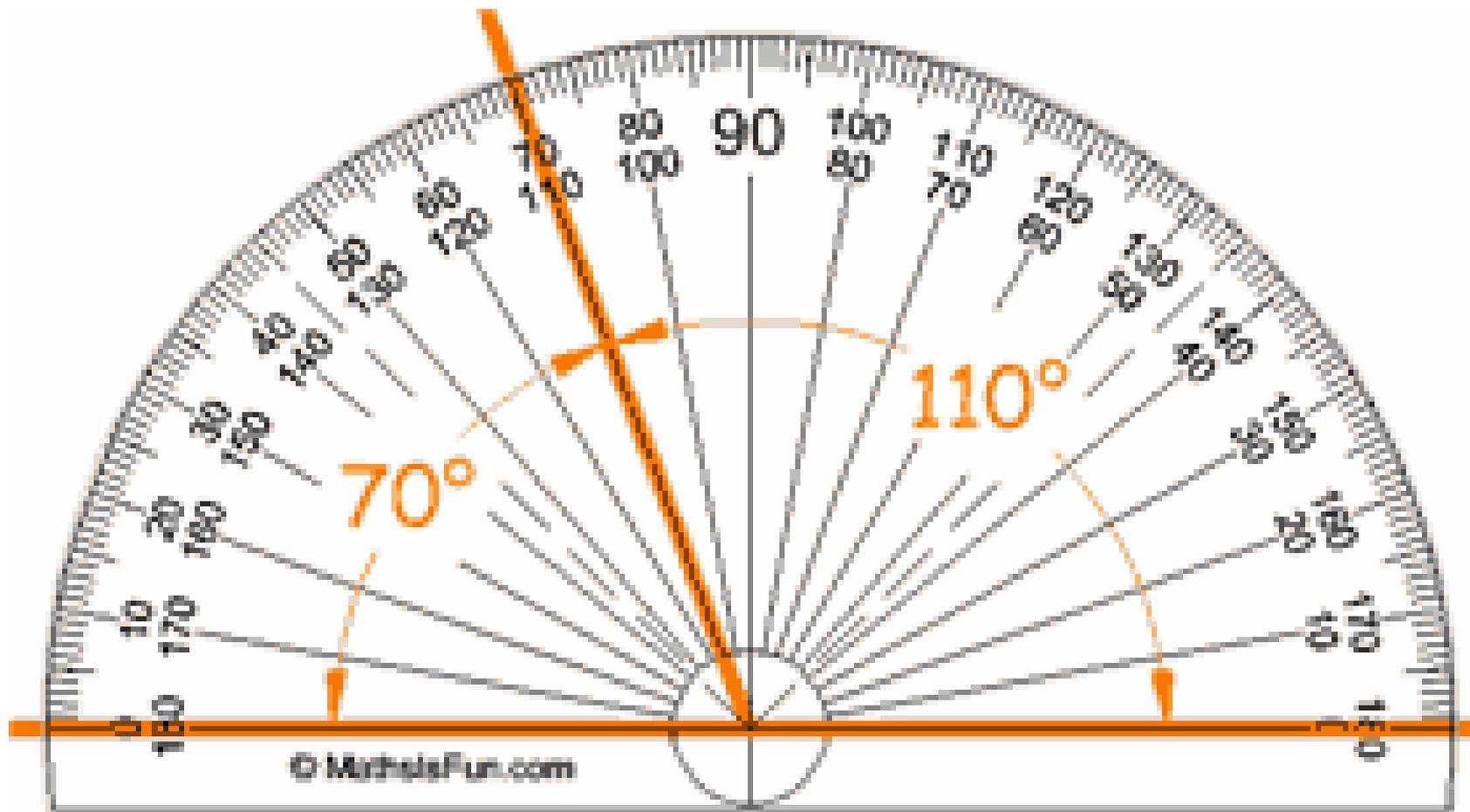


5. **Draw the radius.** Start in the exact center of the circle and draw a straight line to the outside of the circle. (Hint: make a dot with the compass to find the center.)



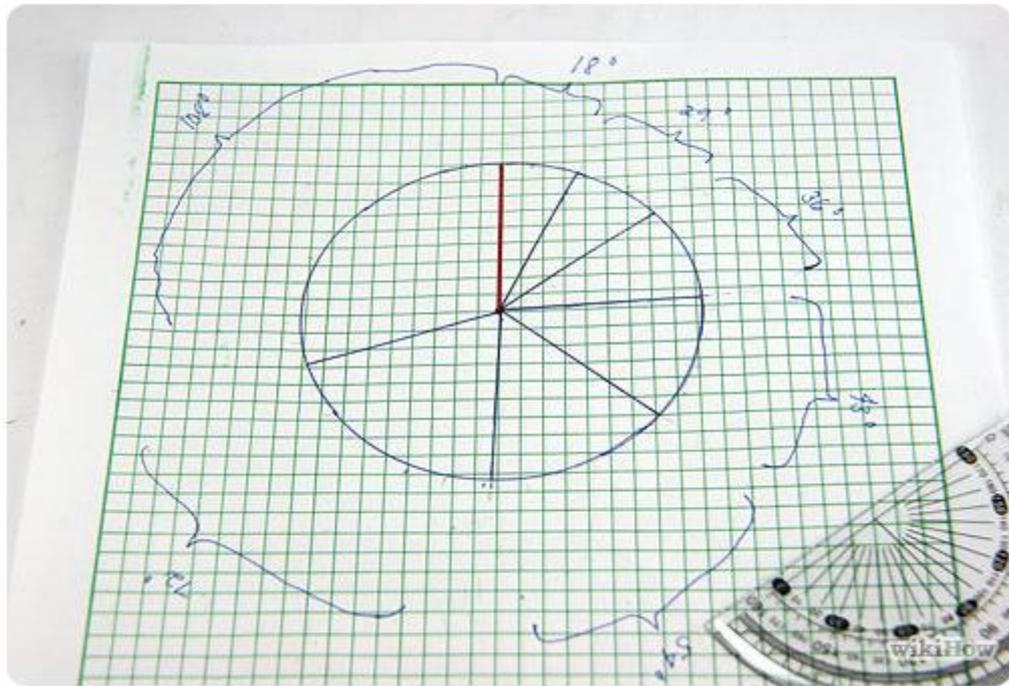
6. Place your protractor on the circle. Position it on the circle so that the 90 degrees are directly above the center of the circle.

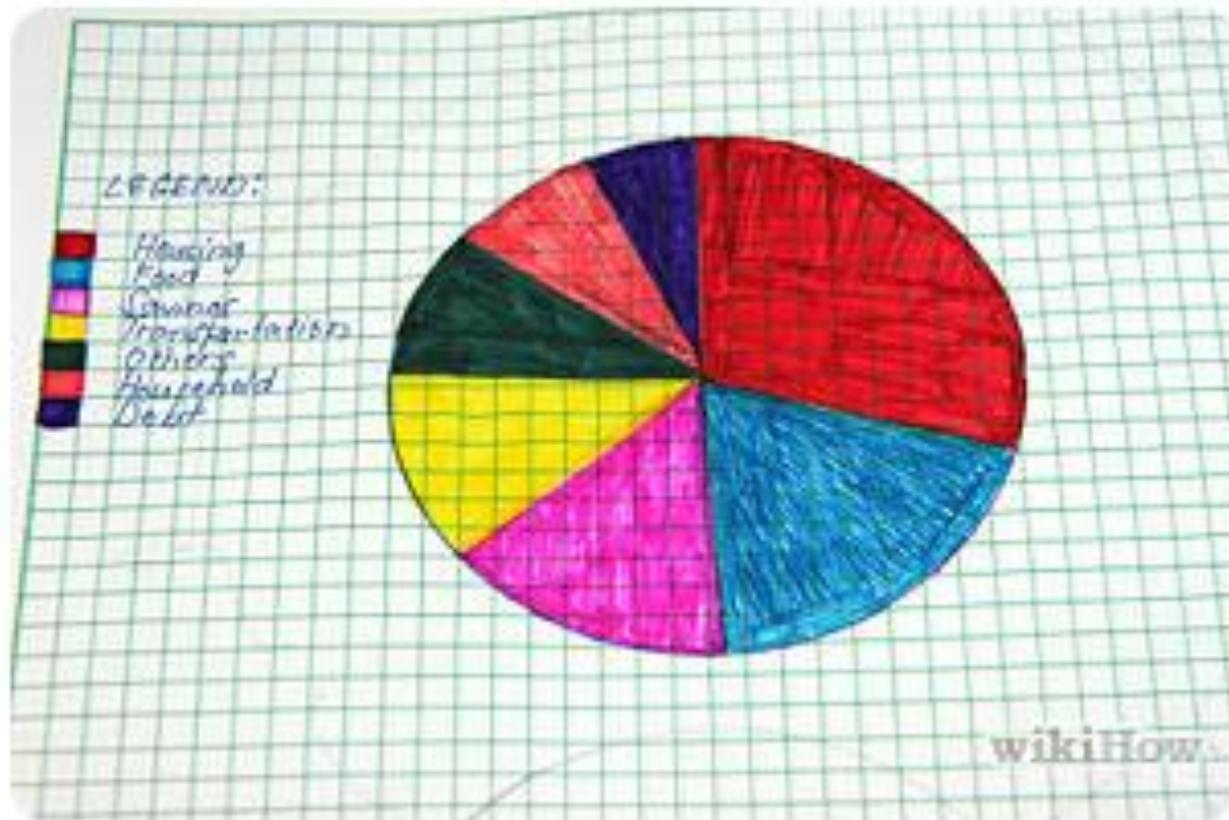




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7. **Draw each section.** Draw the sections by using the angles you got in Step 5. Each time you add a section, the radius changes to the line you just drew - move your protractor accordingly.



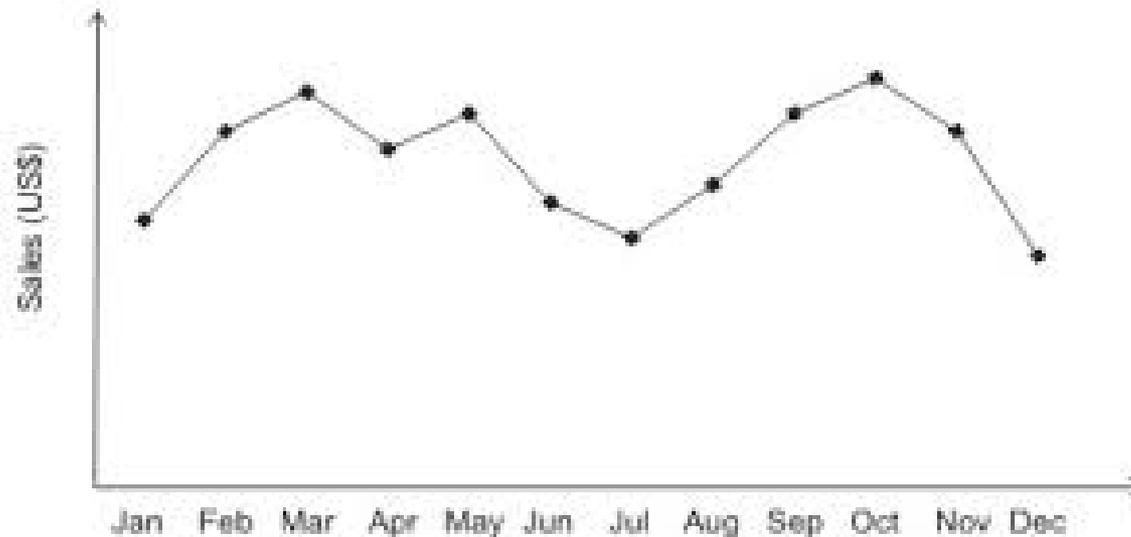


- Remember that all good graphs have a title and labels.
- Add the name of the sections and the percent they represent to the chart.
- Color each section of the pie chart a different color/pattern to easily visualize the results.
- Make sure all angles are accurate.

Line graph

- A series of data points connected by straight line segments.

Figure 3: Example of a Line Graph

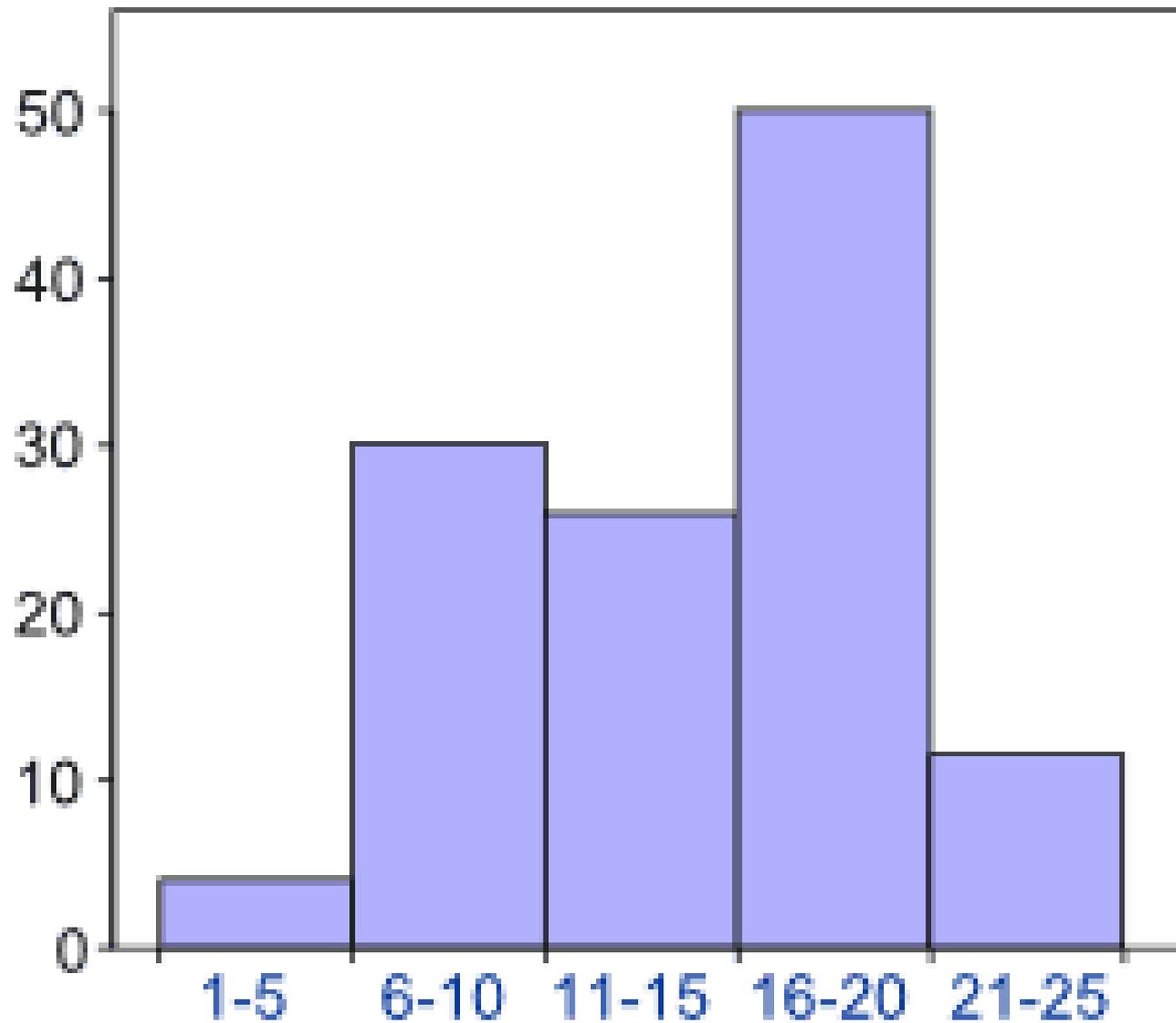


Histogram

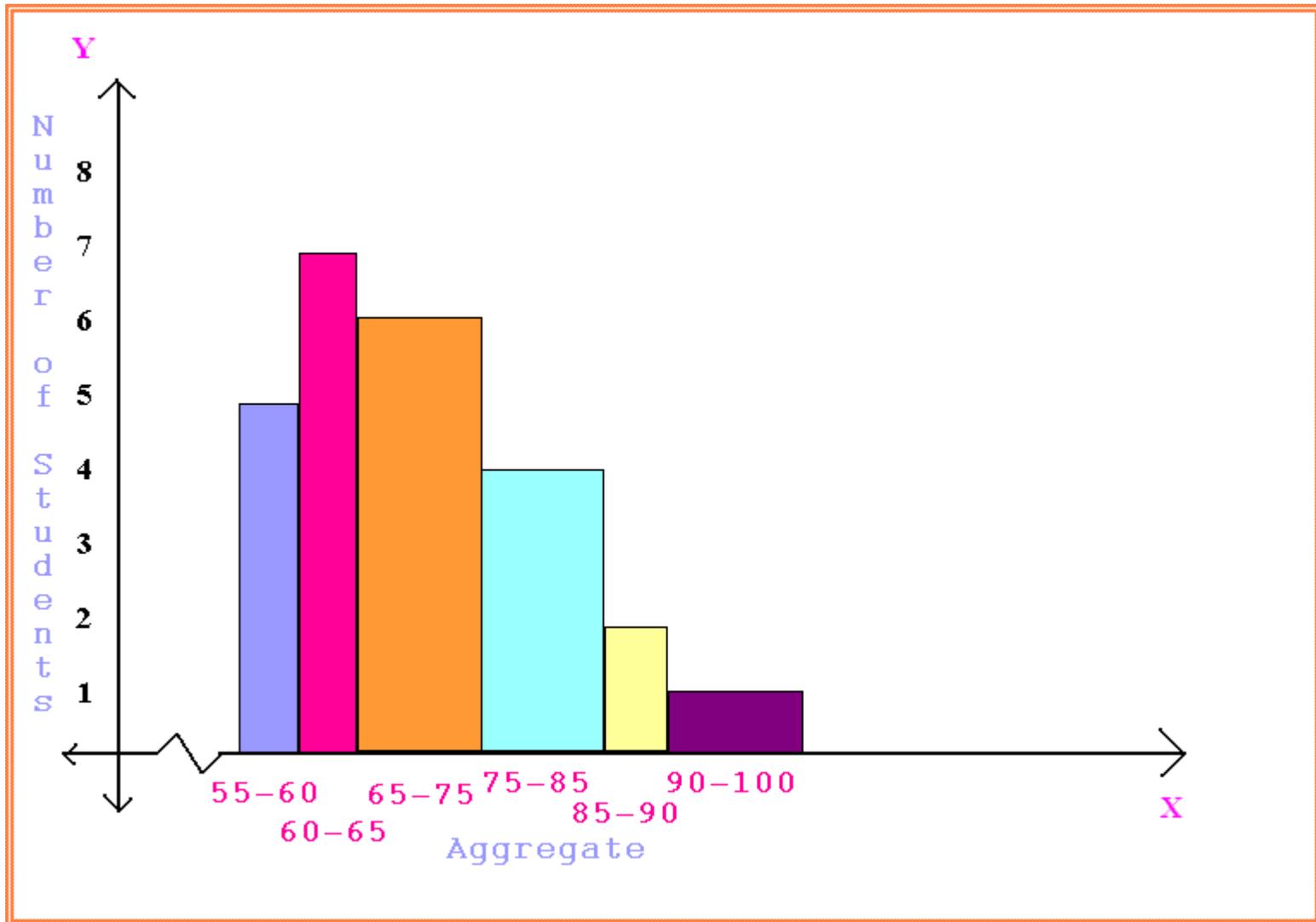
- The area of a bar above a class interval is proportional to the frequency in that class
- **AREA** not HEIGHT
- If there is non-equal size of class interval. Find the *frequency density*

$$\text{Height of block} = \frac{\text{class frequency}}{\text{class width}}$$

Equal histogram



Unequal histogram



Histogram (Frequency density)

The following table shows the ages of 25 children on a school bus:

Age	Frequency (No. of children)
5 – 10	6
11 – 15	15
16 – 17	4

Draw a histogram to represent the above data.

Solution:

Age	Frequency	Frequency density
5 – 10	6	1
11 – 15	15	3
16 – 17	4	2

Try this!

The ages of children entering a theme park in a 1-hour period are recorded in the table:

Age	Frequency (No. of children)
1 – 3	12
4 – 10	14
11 – 18	48

Find the class widths and frequency densities. Then draw a histogram to represent the data.

Frequency polygon

- In a Frequency Polygon, a line graph is drawn by joining all the midpoints of the top of the bars of a histogram.
- gives the idea about the shape of the data distribution

Frequency Polygons

3. Extend lines if necessary $\frac{1}{2}$ a class interval beyond first and last bars

