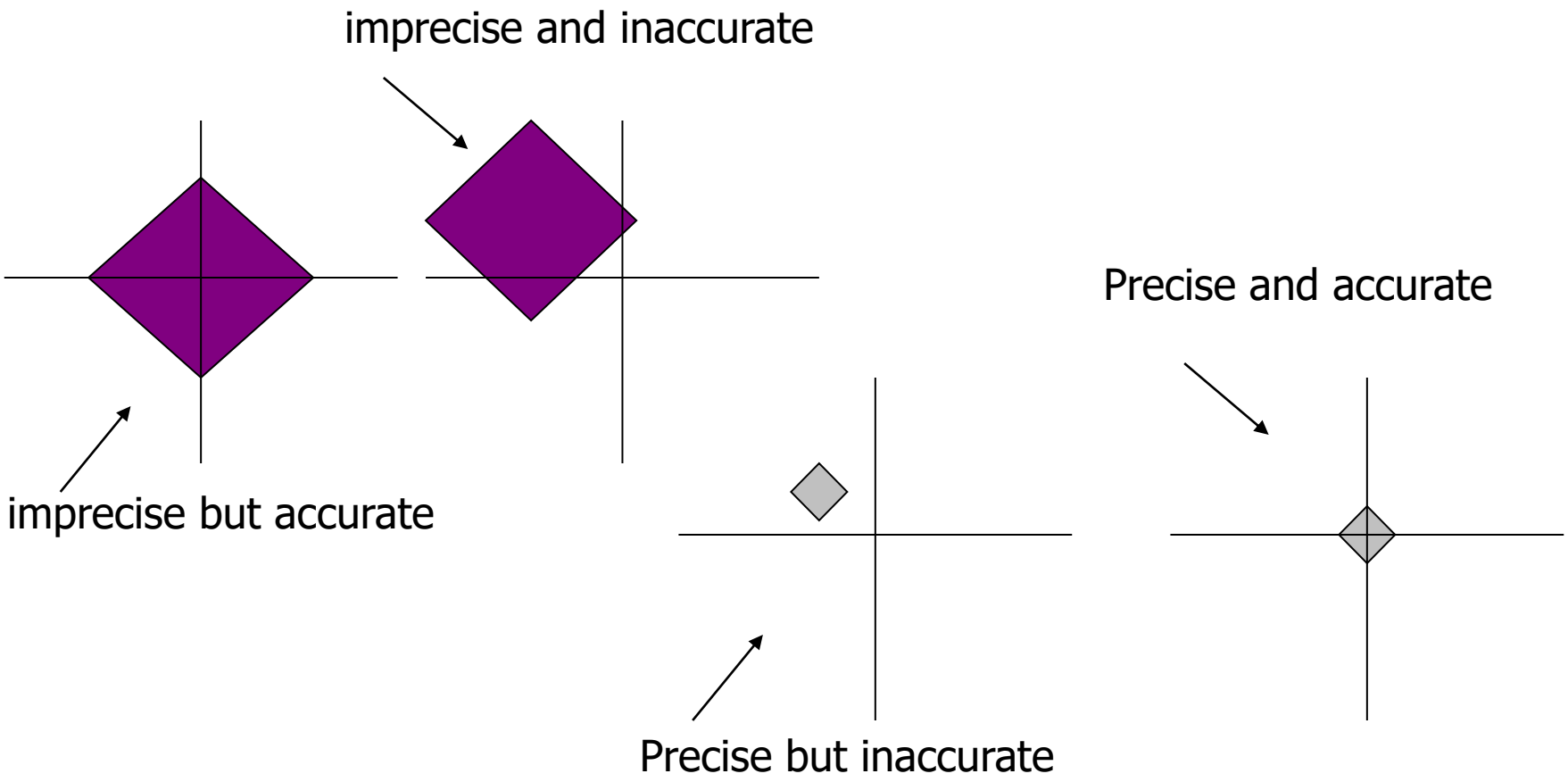
ERROR, ACCURACY & PRECISION



ERROR, ACCURACY & PRECISION

These items very important in GIS mapping works , and how much the final maps can represent the real world , in any work some errors may happen and must be defined and correct .

ACCURACY

Accuracy is the relationship between the value of a measurement and the “ true “ value of the dimension being measured , and how is close a measured value is to the actual (true) value .

The “ true “ value is a concept as no measurement can be done perfectly without error. The objective is to minimize error to acceptable levels.

Precision and accuracy are functions of how data are produced or gathered , The perfect map is not 100% accurate or precise. It is FIT FOR USING .

Accuracy is the degree to which information on a map or in a digital database matches true or accepted values. It is type and quality of data and the number of errors contained in a dataset or a map. In discussing a GIS database, it is possible to consider horizontal and vertical accuracy with respect to geographic position, as well as attribute, conceptual, and logical accuracy.

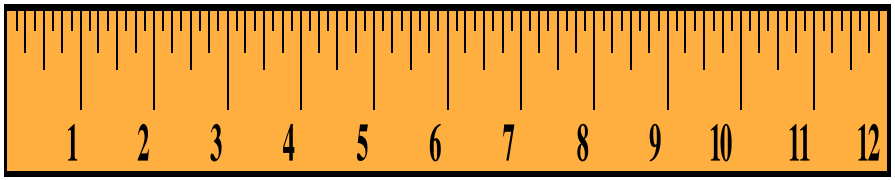
- The level of accuracy required for particular applications varies greatly.
- Highly accurate data can be very difficult and costly to produce and applied .

PRECISION

Precision describes the degree of refinement with which the measurement is made , Confidence levels, I.e. 90% probability . is how close the measured values are to each other.

Any given measurement is precise only to the degree of accuracy with which it was made

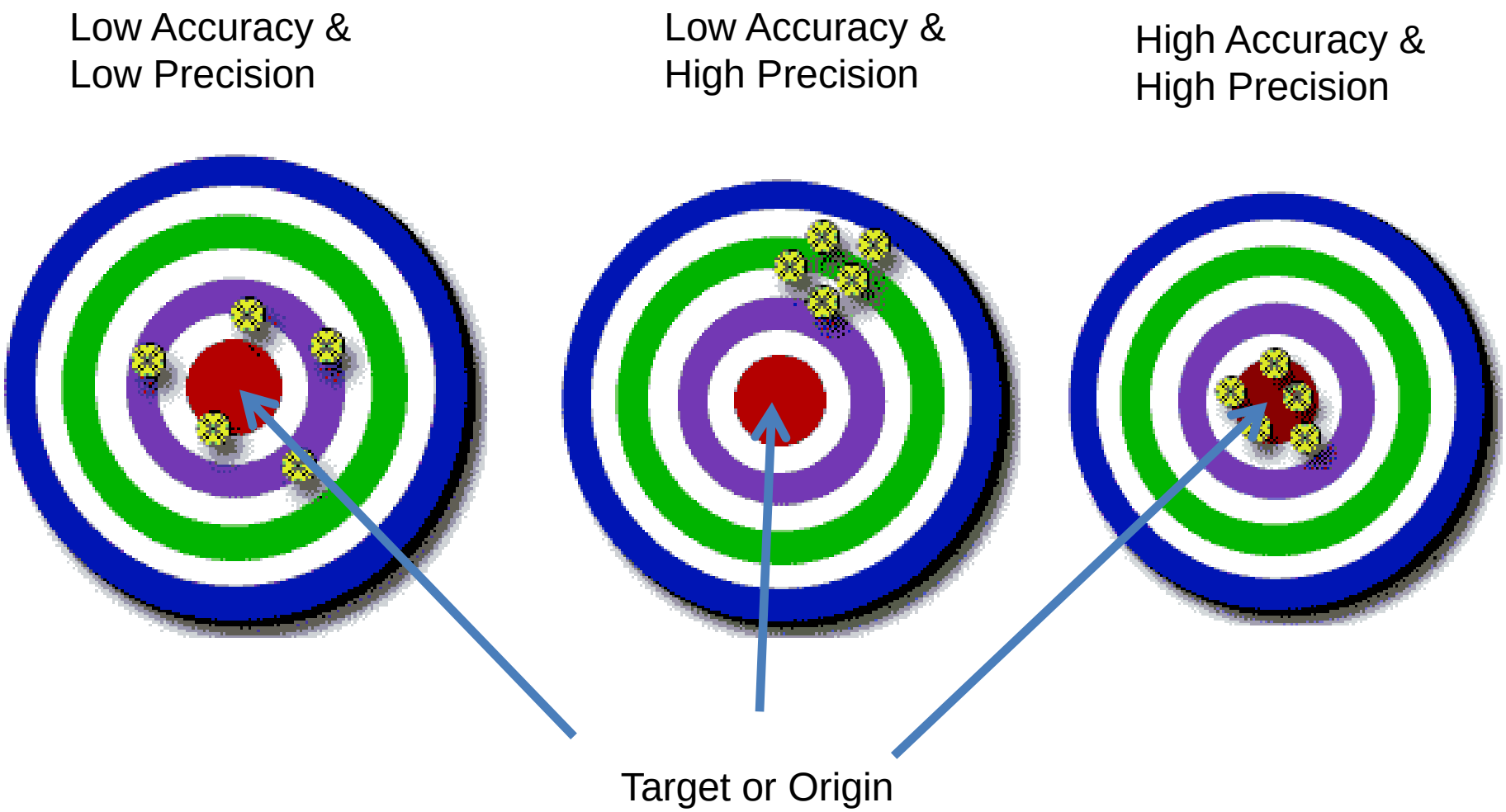
How precise a measurement can be made using the ruler ?



Precision refers to the level of measurement and exact of description in a GIS database. Precise location data may measure position to a part of a unit. Precise attribute information may define the characteristics of features in great detail. that precise data no important how carefully measured may be inaccurate. Surveyors may make mistakes or data may be entered into the database incorrectly.

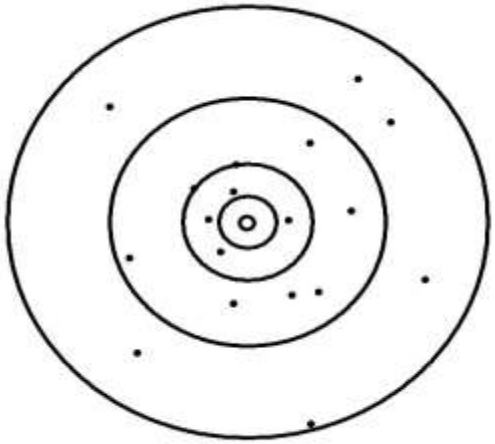
Engineering projects such as roads require very precise information measured to the millimeter . Demographic analyses of marketing make do with less precision. The level of Precision depend on the type of data and project will done .

Highly precise data can be very difficult and costly to collect. Carefully surveyed locations needed by utility companies to record the locations of pumps, wires, pipes and transformers cost $5-20 per point to collect.

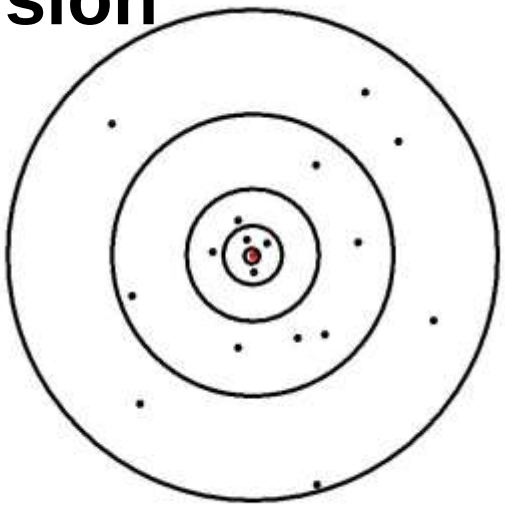


So, if you are always hit the left side instead of middle , then you are **not** accurate, but you **are** precise

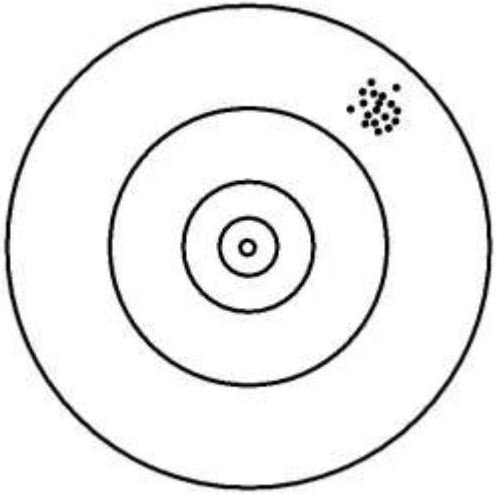
Accuracy And Precision



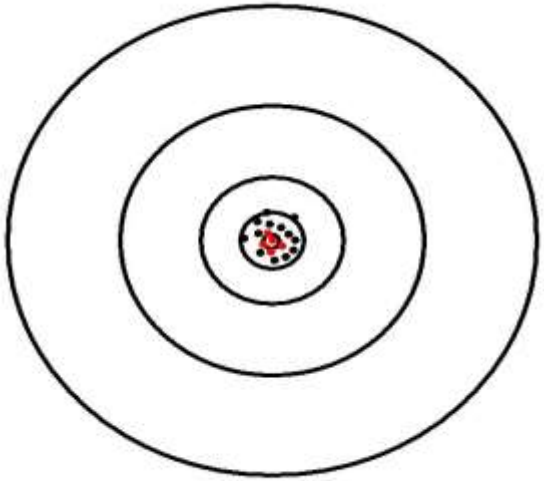
Low Accuracy & Low Precision



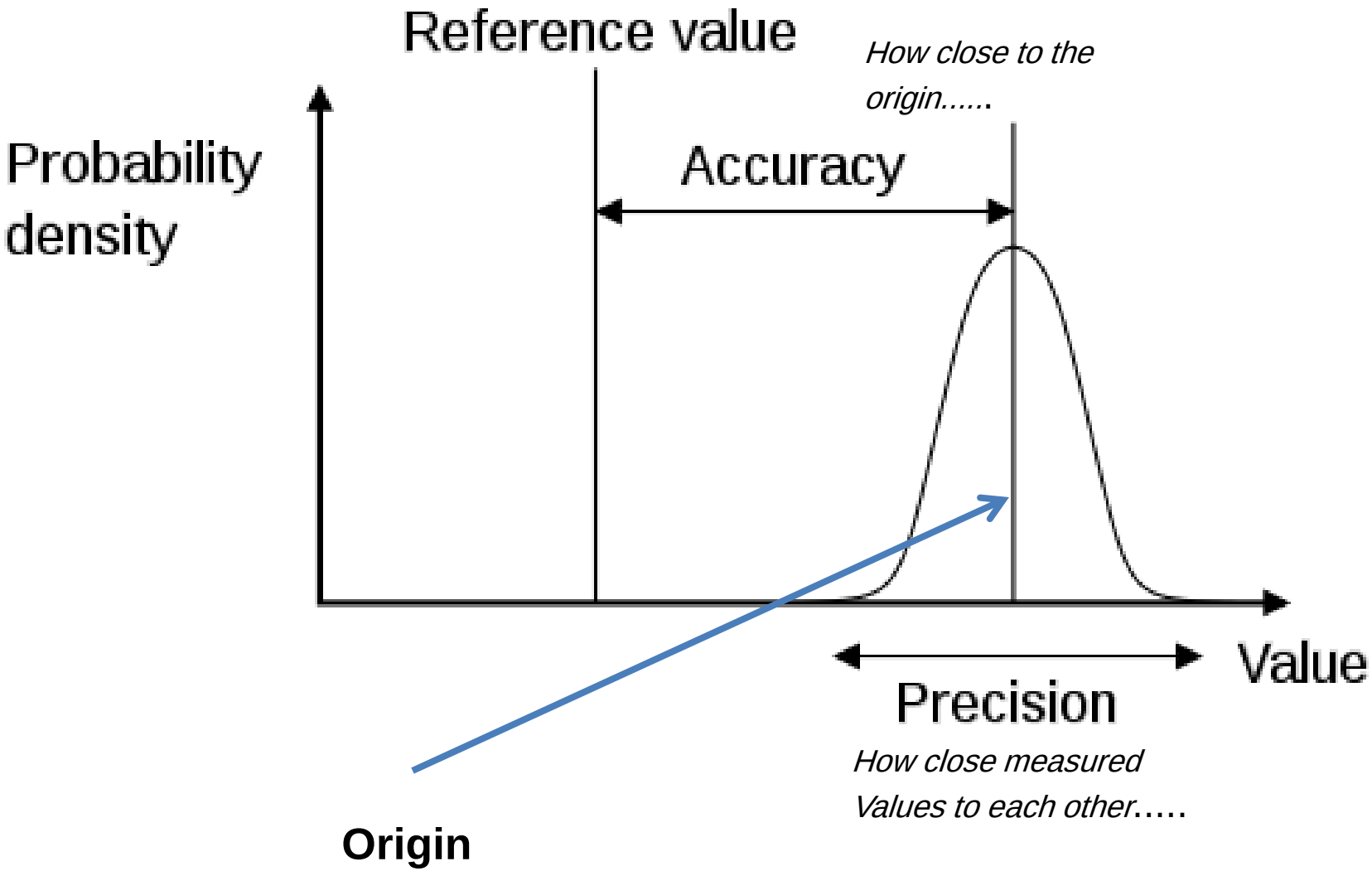
High Accuracy & Low Precision



Low Accuracy & High Precision



High Accuracy & High Precision


Reference value
How close to the origin.....
Probability density
Accuracy
Value
Precision
How close measured Values to each other.....
Origin

ERROR

An error is the difference between a measured, or observed, value and the true value

- The objective is to minimize error to acceptable levels.
- The error in a GIS is normal with the capacity of the system.
- Error in GIS must happen , but must be defined , quantified and planned for solve it .

Types of Error in GIS

1- Positional

2-Attributional

3-Conceptual

4-Numeric

1- Positional

It is the shifting happened in the geographic location of an object from its true ground position , Applies to both horizontal and vertical positions. is a function of the scale at which a map (paper or digital) was drawn .

requirements for horizontal accuracy as 90 percent of all points must be within 1/30th of an inch for maps at a scale of 1:20,000 or larger, and 1/50th of an inch for maps at scales smaller than 1:20,000

SCALE	ACCURACY	SCALE	ACCURACY
1:500	0.25 m	1:10,000	5 m
1:1,000	0.5 m	1:20,000	10 m
1:2,000	1 m	1:50,000	25 m
1:5,000	2.5 m		

large scale data sets have more vertices and shapes and are have greater file sizes. It can be use at smaller scales. Using data (plotting/overlays) at scales less the data's design does not make the data more accurate .

2- Attribute

The non-spatial data linked to location may also be inaccurate or imprecise, may result from mistakes of many sorts. Non-spatial data can also vary greatly in precision with other errors . For example, a precise description of a person living at a home address might include name, age, income, occupation, level of education, and many other characteristics. In any of these data table can error happen .

3- **Conceptual**

GIS depend on the classification of real-world phenomena. The

users determines what type of information is used and how it is classified into groups. Sometimes users may use wrong groups or misclassify information. For example study of drainage systems may involve classifying streams and rivers by "order" that is where a drainage channel fits within the river channels may be misclassified or use wrong conception .

4- Numeric

Computers can only use numeric calculations out to a real numbers and decimal , its correct before introducing errors and may be wrong if any errors happen in , Since GIS process data digitally, numeric errors may be inserted at the process .