

GIS

B Holland

Longitude and Latitude



PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David
SWANSEA - ABERTAWE

Introduction

- The Geographical Information System provides only a computer representation of the real world.
- This is a simplified view of reality, but hopefully containing the features important to your study.
- The GIS should be populated with ideas about how these data interact and this can be termed a spatial model.
- Chorley et al suggest that a spatial model places emphasis on reasoning about the real world by means of translations in space.
- Thus we can solve geographical problems that would be otherwise difficult to model.

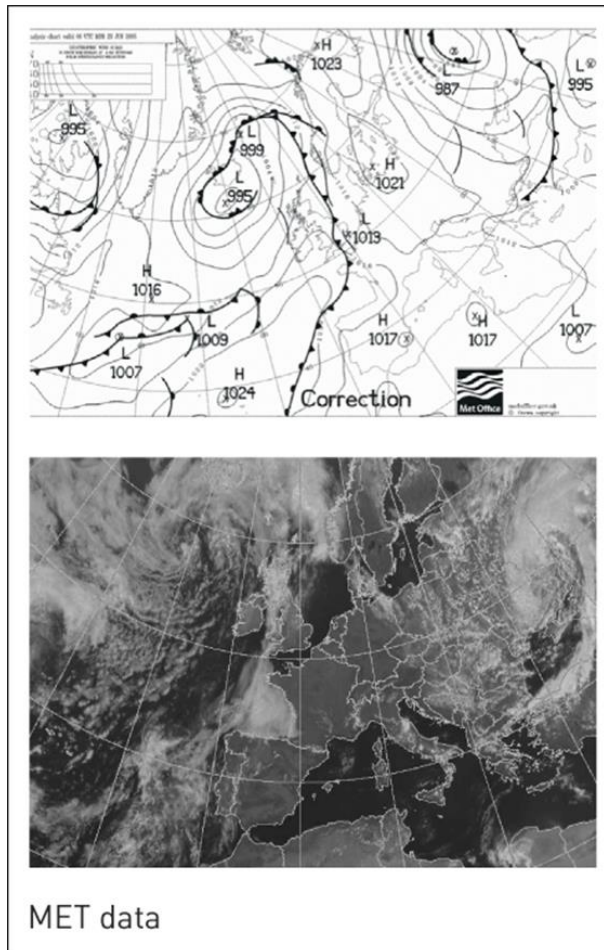


Topographic, Thematic etc..

- There are many different types of maps. However (*Robinson et al..*) the following processes need to be considered:
 - Establish the purpose
 - Define the scale
 - Select the feature (spatial entities) from the real world that you want to portray
 - Choose a method to represent the features point line area
 - Generalize the feature to provide a two dimensional representation
 - Use a map projection
 - Apply a spatial referencing system to locate features relative to each other
 - Annotate your map with keys Legends and appropriate text.



Data on the Earth's Surface

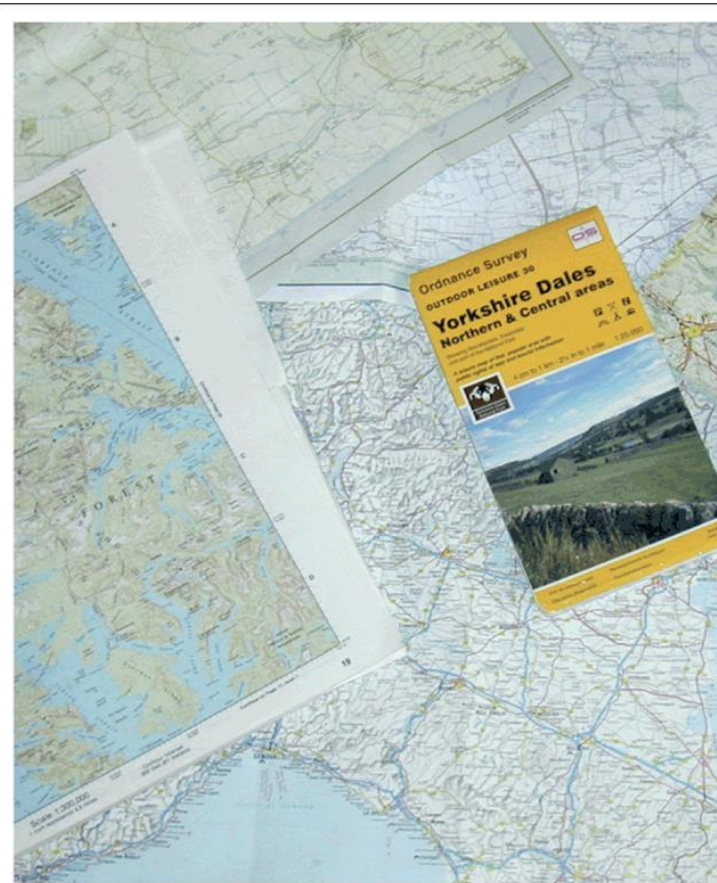


Examples of (a) paper maps

Source: (a) Maps reproduced by permission of Ordnance Survey on behalf of HMSO. © Crown Copyright 2006.

All rights reserved. Ordnance Survey

License number 100030901; image shown on map brochure courtesy of Peter Baker / International Photobank



(a)



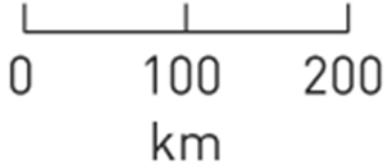
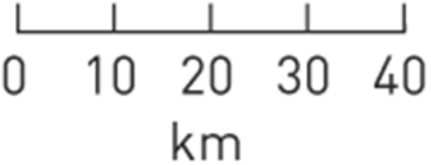
PRIFYSGOL CYMRU
Y Drindod Dewi Sant
UNIVERSITY OF WALES
Trinity Saint David
SWANSEA - ABERTAWE

Scale

- Virtually all maps and spatial data are smaller than the reality they represent.
- Scale gives us an indication of their real size.
- We could think of scale as an order of magnitude or the level of Generalisation applied to the objects.



Expressions of scale

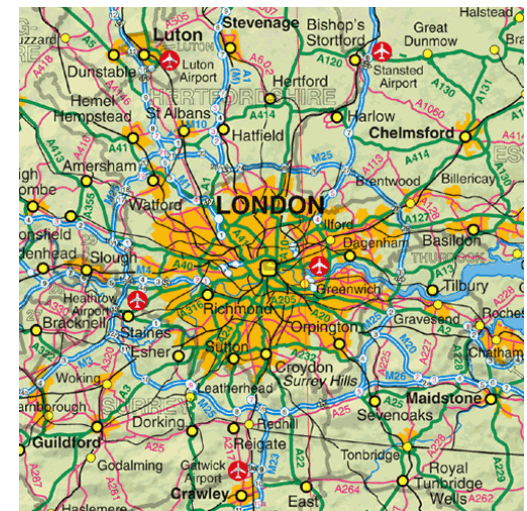
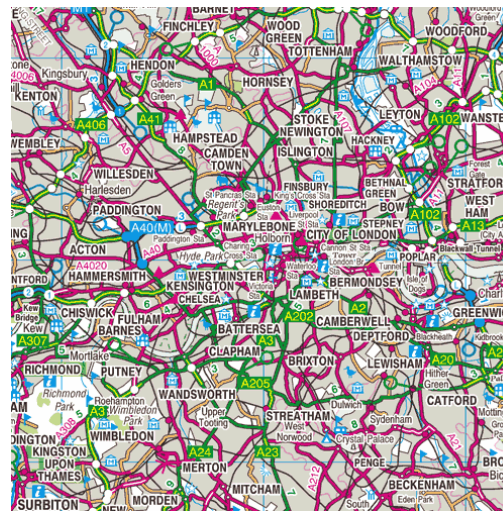
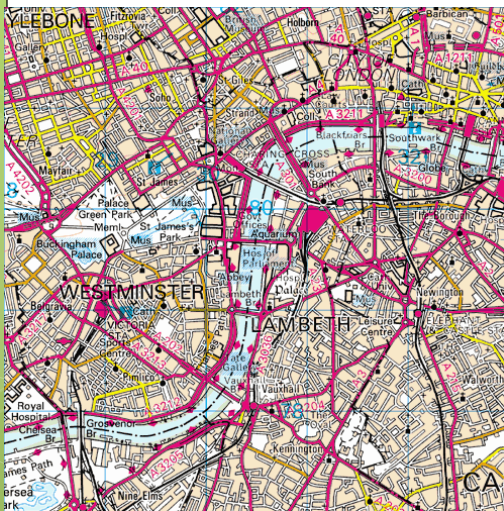
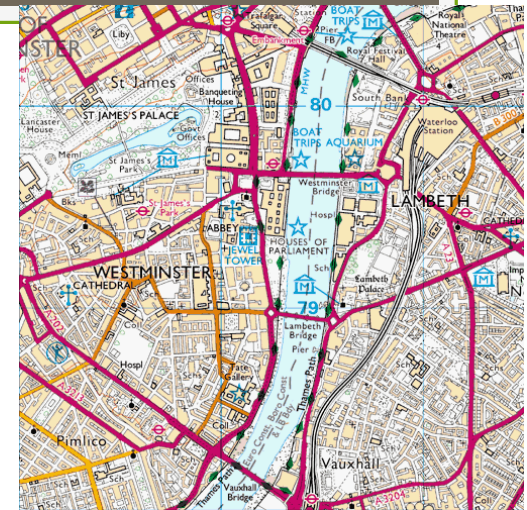
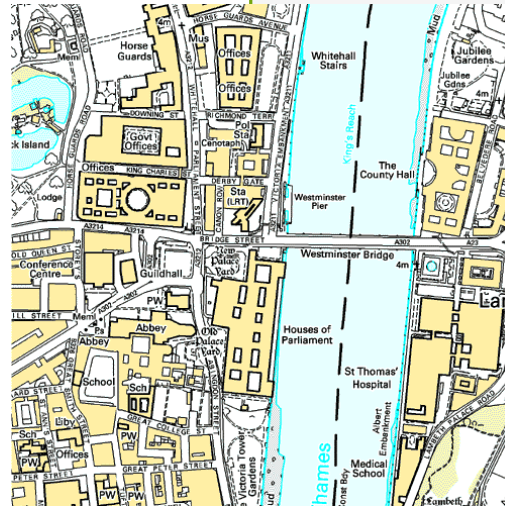
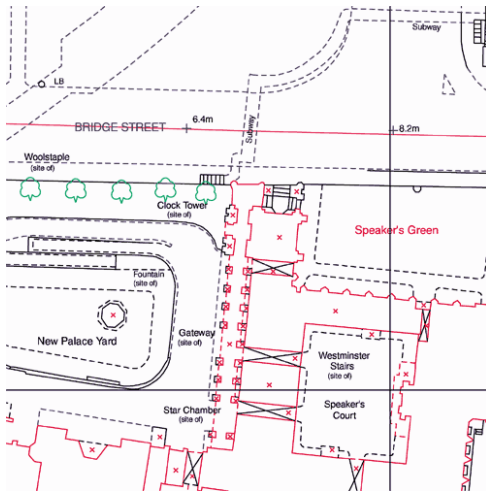
Ratio	1:5000	1:1,000,000
Verbal (nominal)	1 cm represents 50 m	1 cm represents 10 km
Graphical		



Spatial Entities

- ◉ Usually represented by point line or area
- ◉ This could depend on the scale of the mapped area you are trying to model
- ◉ OS used different methods of representation depending on the scale

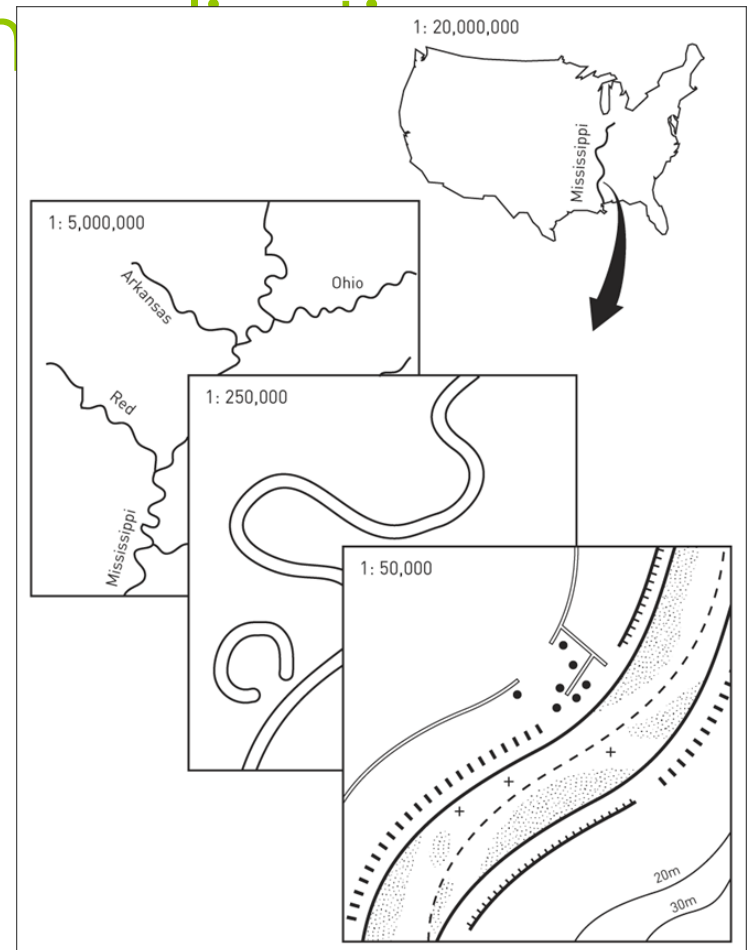




OS Superplan, Landplan, Explorer, Landranger, Tour, Route maps Crown copyright
2006

Scale-related generalisation

the process of reducing detail on a map as a consequence of reducing the map scale



Understand Longitude and Latitude Coordinates

& Map projections



X and Y

- There are two major axes that separate the world. Vertical lines are called Longitude lines, and they refer to the X-coordinate. Horizontal lines are called Latitude lines, and they refer to the Y-coordinate .
- The location of the Equator is identified by the X-axis at zero degrees Latitude (wrapping around the globe like a horizontal belt). The Location of the Prime Meridian is identified by the Y-axis at zero degrees Longitude (wrapping around the globe from top to bottom vertically).
- The place where the Equator and Primer Meridian intersect creates four quadrants
- The first quadrant has both positive X and Y coordinates, the 2nd quadrant has negative X and positive Y coordinates. The third quadrant has negative X and negative Y coordinates, and the 4th has positive X and negative Y.
- These basic concepts will help you understand how to get your records with coordinate information on the map.



Create Points

- Some of the data you use may contain X and Y coordinates for the location of that record. If this is the case, MapInfo can read those coordinates and create a point at that location using the “Create Points” command.
- Before plotting the data on the map, you should have an understanding of the basics of longitude/ latitude coordinates and how they relate to the surface of the earth.



The Earth from space and some commonly used global map projections

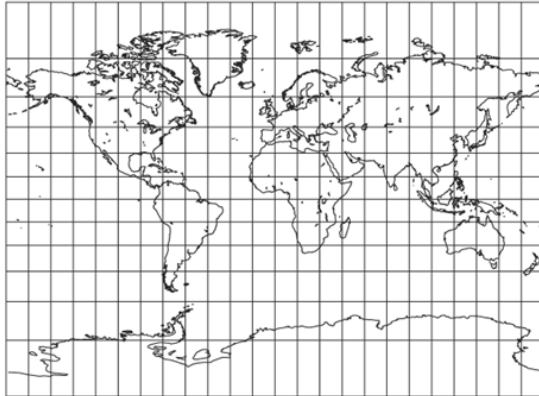


(a) The Earth from space

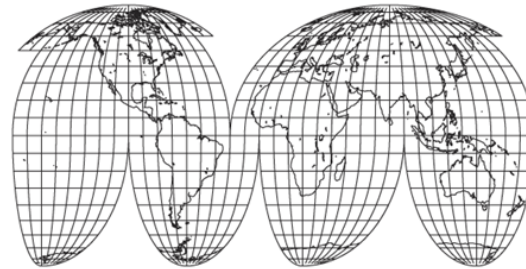


(b) Lambert conformal conic

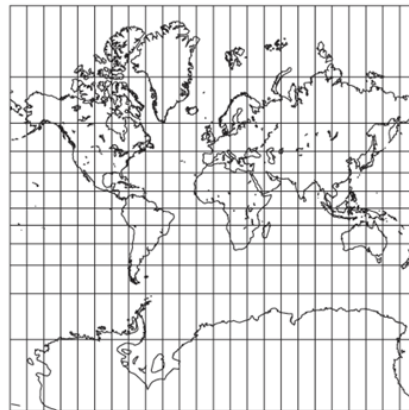




(c) Miller Cylindrical



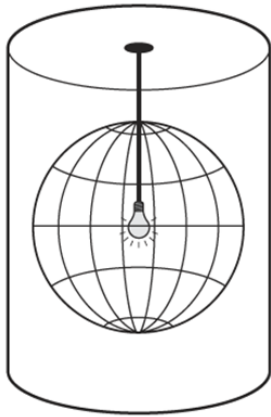
(d) Mollweide



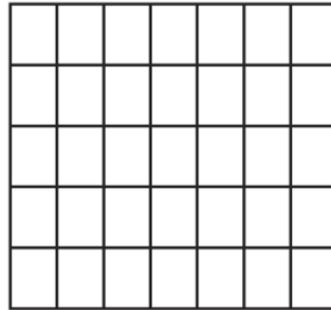
(e) Mercator



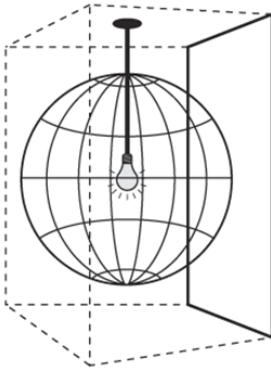
Projections: (a) cylindrical; (b) azimuthal



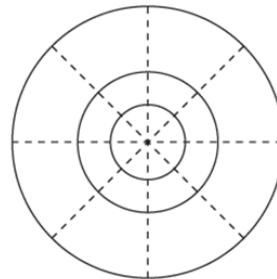
(a) Cylindrical projection (*light in a circular room analogy*)



- Continuous picture of the Earth
- Countries near the equator in true relative positions
- Distance increases between countries located towards top and bottom of image
- The view of the poles is very distorted
- Area for the most part is preserved



(b) Azimuthal projection (*light in a square room with flat walls analogy*)



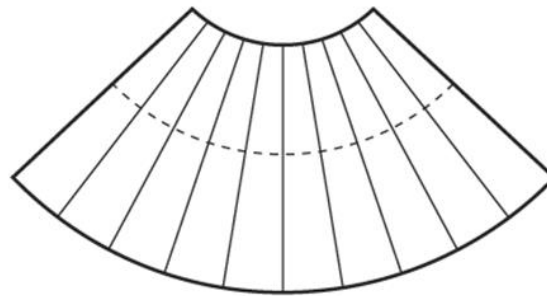
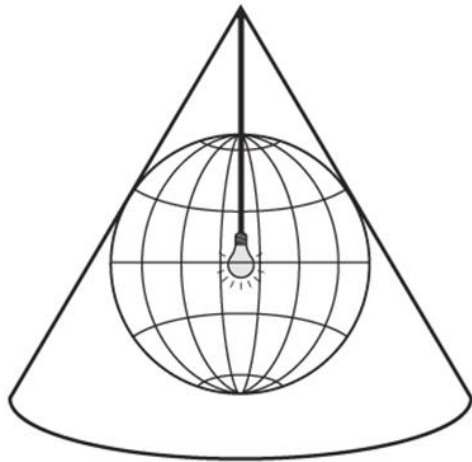
- Only a part of the Earth's surface is visible
- The view will be of half the globe or less
- Distortion will occur at all four edges
- Distance for the most part is preserved



PRIFYF
YD

UNIVERSITY OF WALES
Trinity Saint David
SWANSEA - ABERTAWE

Projections: (c) conic (Continued)

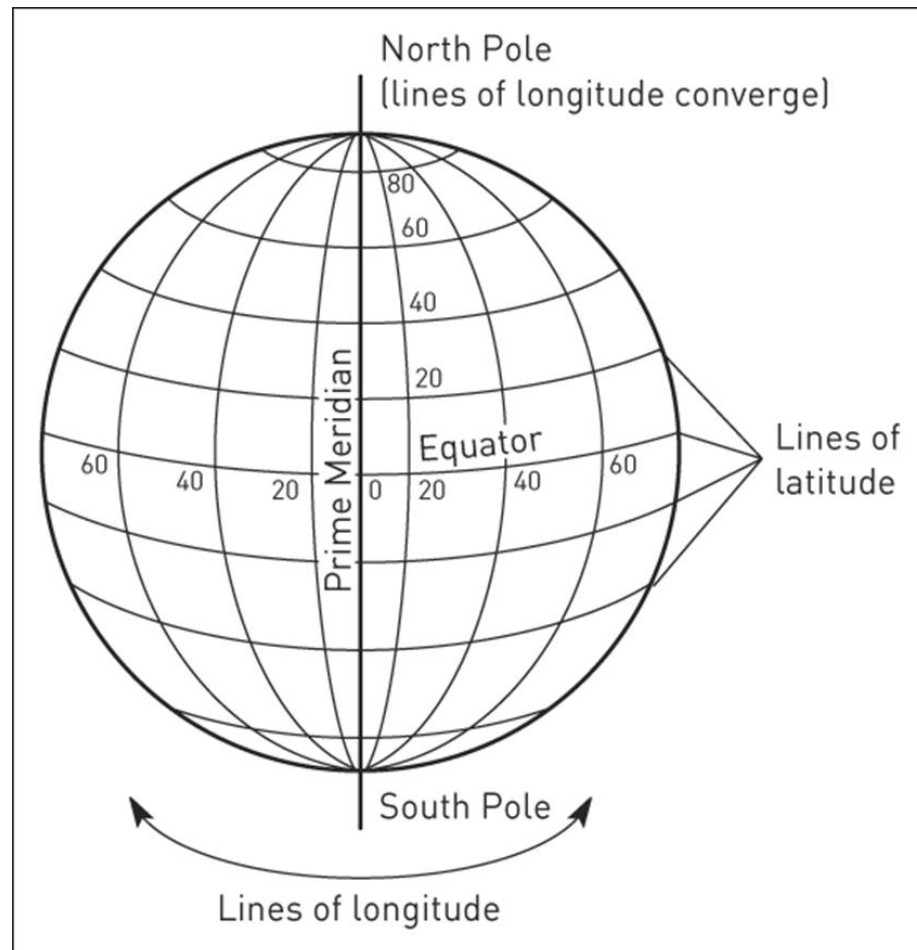


- Area is distorted
- Distance is very distorted towards the bottom of the image
- Scale for the most part is preserved

(c) Conic projection (*light in a tepee analogy*)



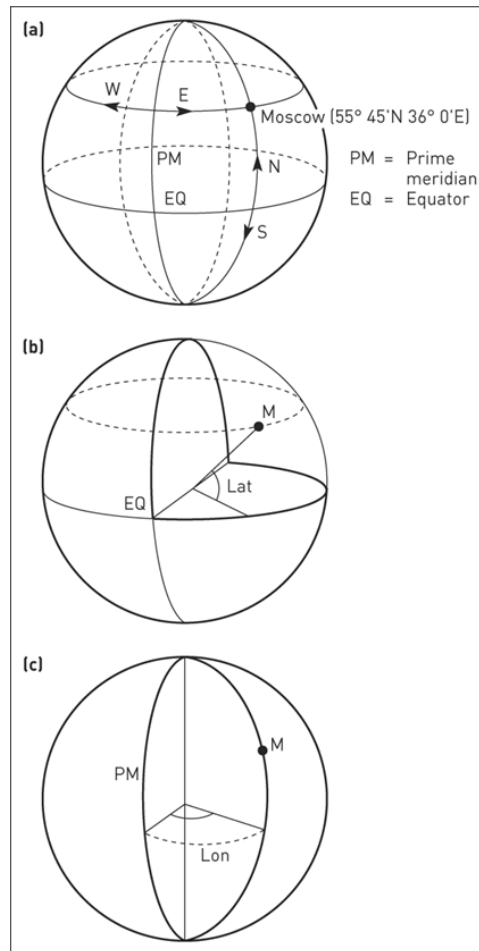
Latitude and longitude



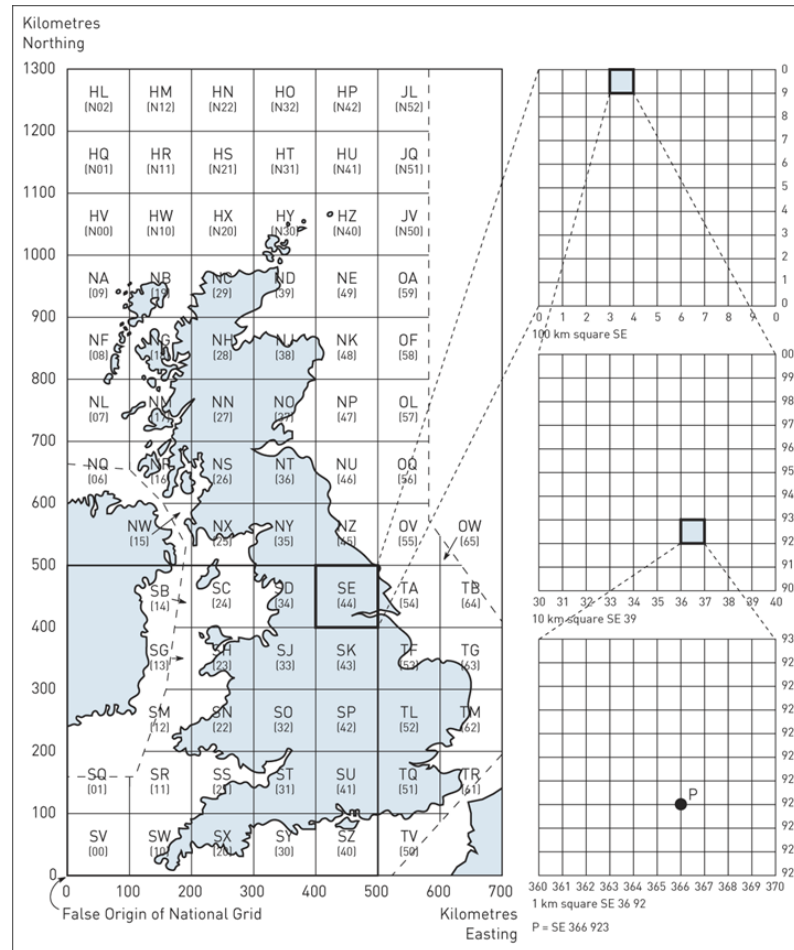
- The first quadrant has both positive X and Y coordinates, the 2nd quadrant has negative X and positive Y coordinates. The third quadrant has negative X and negative Y coordinates, and the 4th has positive X and negative Y.



a) Latitude and longitude of Moscow; (b)
calculating the latitude;
(c) calculating the longitude



The Ordnance Survey National Grid system



The UK postcode system

