

1.1 Introduction to Maps

Name: _____ Class: _____ Date: _____ **Total: 10 marks**

KEY WORDS map 地图 • distort 扭曲 • projection 投影 • thematic map 专题地图
• reference map 参考地图

Objective

Build the skills to answer exam questions on **maps** 地图 and **map projections** 地图投影.

You must be able to:

- distinguish a **reference map** 参考地图 from a **thematic map** 专题地图
- explain why every **projection** 投影 distorts shape, area, distance, or direction
- match a projection (Mercator, Gall-Peters, Robinson) to its main distortion
- read **map scale** 比例尺 and say what a large- vs small-scale map shows

1 Worked examples

Study these first. Each one shows the method for a task used later.

■ Reference vs thematic maps

A **reference map** shows locations — borders, cities, roads. A **thematic map** shows the spatial pattern of one variable, such as population density or climate.

■ Why projections distort

The Earth is a sphere; a map is flat. Flattening it always distorts at least one of **shape, area, distance, or direction**. No projection preserves all four.

■ Matching projection to distortion

Mercator keeps direction/shape but greatly exaggerates area near the poles. **Gall-Peters** keeps area true but distorts shape. **Robinson** is a compromise, distorting each a little.

2 Practice

2.1 State one difference between a reference map and a thematic map. [2]

2.2 Explain why a flat map of the whole world must distort the Earth. [2]

2.3 The Mercator projection is common in classrooms and online maps.
(a) State the property the Mercator projection preserves. [1]

(b) State the main distortion it introduces. [1]

3 Exam-style questions

3.1 A map showing the percentage of each country's population that is urban is best described as a [1]

- **A** reference map
- **B** thematic map
- **C** political map
- **D** topographic map

3.2 A geographer needs true compass bearings for ocean navigation. The best projection is [1]

- **A** Gall-Peters (equal-area)
- **B** Mercator (conformal)
- **C** an equal-area interrupted map
- **D** a cartogram

3.3 A city planner uses a street map of one neighbourhood; a student uses a map of the whole world.

(a) Which map is larger scale? [1]

(b) State one thing the larger-scale map shows that the smaller-scale map cannot. [1]

Solutions

2.1 a reference map shows locations/features; a thematic map shows the pattern of one variable.

2.2 the Earth is a sphere and a map is flat; flattening a curved surface must distort shape, area, distance, or direction.

2.3 (a) direction / true shape locally. (b) it exaggerates area toward the poles (e.g. Greenland looks huge).

3.1 B. it maps the spatial pattern of one variable, so it is a thematic map.

3.2 B. Mercator preserves direction, which is why it was designed for navigation.

3.3 (a) the neighbourhood street map. (b) fine local detail — individual streets/buildings.