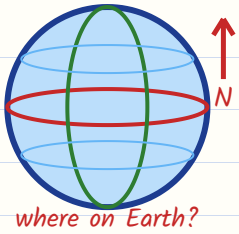
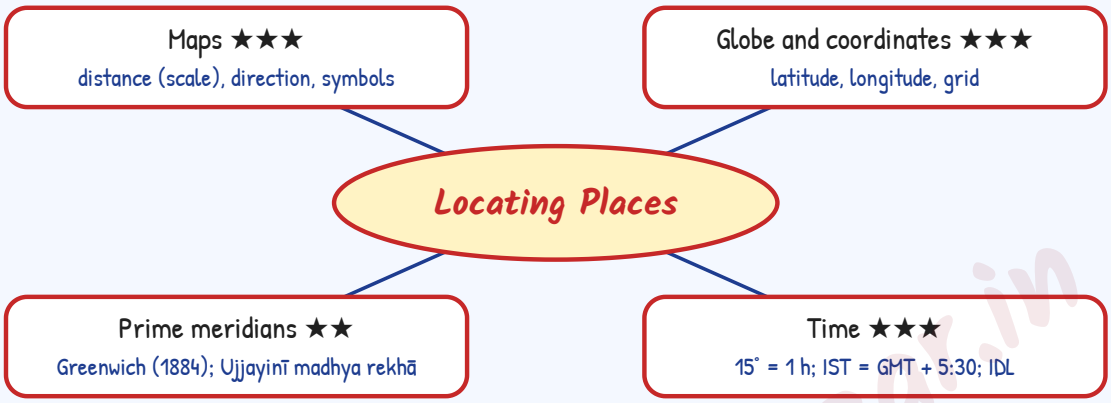
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Locating Places on the Earth



New NCERT Exploring Society: India and Beyond, Grade 6 · 2026-27

Chapter map (★ = important for tests)



What is inside

1. A city map; Let's explore
2. Map and its components: kinds, scale
3. Directions and symbols
4. Mapping the Earth; coordinates
5. Latitudes; longitudes, hemispheres
6. India's madhya rekhā; India on the grid
7. Time zones, local and standard time, IDL
8. Questions, activities and projects 1–8; solved time sums, keywords
9. Exam-style questions, 3 case studies, practice set of 48, 20 MCQs, 6 A–R, answers, summary

★ **Exam tip:** **Score here**: three map components **distance, direction, symbols**; latitude = distance from the **Equator** (0° to 90°N/S); longitude = distance from the **Prime Meridian** (0° to 180°E/W); **15° = 1 hour**, 1° = 4 minutes; **IST = GMT + 5 h 30 min.**

Must-know words: map, atlas, scale, cardinal directions, symbol, globe, coordinates, latitude, longitude, Equator, Prime Meridian, grid, local time, standard time, time zone, International Date Line.

Based on NCERT "Exploring Society: India and Beyond" Grade 6 (2026-27), Chapter 1. Figures redrawn and answers written by us. New book: questions are Exam-style.

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Opening quote (Āryabhaṭa, about 500 CE): "The globe of the Earth stands in space, made up of water, earth, fire and air and is spherical ... surrounded by all creatures, terrestrial as well as aquatic."

The Big Questions
1. What is a map and how do we use it? What are its main components?
2. What are coordinates? How can latitude and longitude mark any location on the Earth?
3. How are local time and standard time related to longitude?

A map of a small city (Fig. 1.1) ★★

The map shows a railway station (top left), a lake, apartments (top), the Nagar Panchayat and a bank (centre right), a public garden (top right), a hospital (centre), a school (bottom left), a market (bottom centre) and a museum (bottom right), joined by roads, with four arrows (N, E, S, W) in the top right corner.

> **Ans.** **Station to bank**: from the station take the road east past the lake, continue past the Nagar Panchayat to the bank (another way: go south past the school and the market, then north-east to the bank). **Bank to market**: go south-west along the road past the museum side to the market at the bottom.

Let's explore (page 9)

> **Ans.** **1.** The **hospital** is the pink building with a red cross in the middle of the map, below the lake. **2.** **Blue areas** show **water**: the river flowing from the top and the **lake**. **3.** The **public garden** (top right) is the **farthest** from the railway station; the school is nearest, the Nagar Panchayat in between.

> **Ans.** **Group activity: map of our school**: draw the school building in the centre, the gate, playground and the roads leading to it, and mark neighbouring buildings (shops, temple, bus stop). Add a north arrow. Comparing maps, we find that groups drew different sizes and details, so we need agreed **scale, directions and symbols**.

★ *Exam tip:* **Remember**: a map is like a **treasure guide**: it shows where things are and how to reach them.

A map and its components ★★★

> *Definition* ✎ **Map**: a representation (drawing) of an area: small (village, town), bigger (district, state) or very large (India, the world), seen **as if from the top**. **Atlas**: a book or collection of maps.

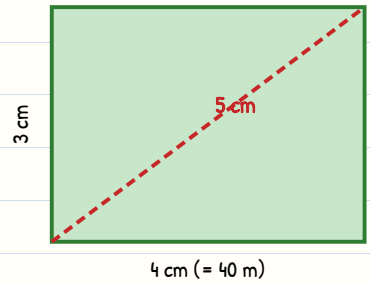
Kind of map	Shows	Example
physical	natural features: mountains, oceans, rivers	physical map of India (Fig. 5.2)
political	countries or states, boundaries, cities	India with States, UTs and capitals
thematic	one specific kind of information	rainfall, crops, languages (Fig. 6.3, 8.1)

> *Definition* ✎ **Three components of maps**: **distance** (shown by the scale), **direction** and **symbols**.

Distance and scale ★★★

> **Ans.** A huge place fits on paper thanks to the **scale**: each centimetre on the map stands for a fixed distance on the ground. In Fig. 1.1, **1 cm = 500 m**. On the India map (Fig. 5.2), a 2.5-cm ruler marked "500 km" means **2.5 cm = 500 km**, i.e. **1 cm = 200 km**. The actual distance between two points depends on the scale used.

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scale 1 cm = 10 m

diagonal on paper = 5 cm

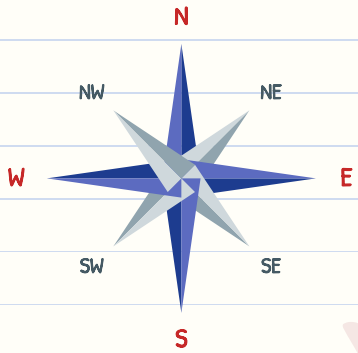
real diagonal = 5 × 10 = 50 m

(check: 3, 4, 5 triangle)

Let's explore: the playground (40 m × 30 m) drawn to scale

Scale sums	Working	Answer
1 cm = 500 m; map distance 3 cm	3 × 500	1500 m = 1.5 km
2.5 cm = 500 km; map distance 5 cm	5 × 200	1000 km
1 cm = 10 m; real length 40 m	40 ÷ 10	4 cm on paper

Direction ★★★



cardinal: N, E, S, W

(clockwise from the top)

intermediate: NE, SE, SW, NW

most maps show only an arrow "N"

Cardinal and intermediate directions

Let's explore: true or false? (Fig. 1.1)

Statement	T/F	Why
1. The market is north of the hospital.	F	the market is south (slightly east) of the hospital
2. The museum is southeast of the bank.	T	it lies below the bank and a little to the right (east)
3. The railway station is northwest of the hospital.	T	it is to the left (west) and a little above (north)
4. The lake is northwest of the apartment blocks.	F	the lake is below and to the left: southwest

> **Ans.** My home from school: find north with a compass or the morning Sun (east); then note whether home lies roughly north, south, east or west of the school (e.g. "my home is about 2 km south-east of my school").

Symbols ★★★

> **Definition** ✎ There is no space to draw every building on the map of a city or country, so symbols represent features: buildings, roads, railway lines, rivers, ponds, forests. Many details fit in a small space. Different countries use different sets; in India the Survey of India (a government body) has fixed standard symbols.

Feature (Fig. 1.2)	How it is shown
railway line, station	black line with cross-bars (broad / metre gauge); RS

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roads	double lines: metalled (filled), unmetalled (dashed)
boundaries	dash-dot lines: international, state, district
river, well, tank, canal, bridge	blue lines and shapes
temple, church, mosque, chhatri	small picture symbols
post office, P&T office, police station	PO, PTO, PS
settlement, graveyard; trees, grass	shaded block, small signs; green tree and grass signs

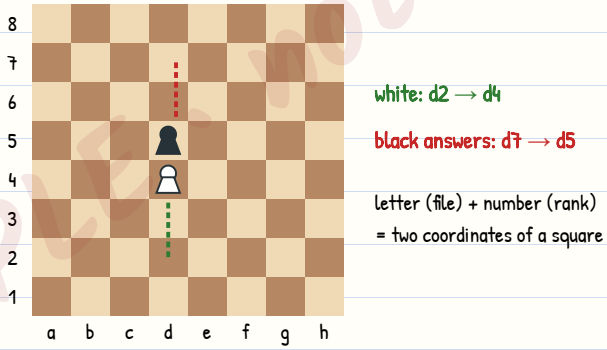
Ans. **Let's explore: rough map of my locality**: draw home, school, a temple or mosque, post office, well or tank, shops and roads; show the north arrow and use symbols from Fig. 1.2 (PO, a blue circle for a well, double lines for roads, tree signs for a park).

Mapping the Earth ★★★

Definition ✎ The Earth is nearly a **sphere** (slightly flattened at the poles). A sphere cannot be shown accurately on flat paper: peel an orange in three or four large pieces and try to flatten them; they tear at the edges. A **globe** is a sphere (metal, plastic or cardboard) with a map drawn on it (of the Earth, the Moon, Mars or the sky). It represents the Earth's geography **better than a flat map**, because it has the same shape.

a) Understanding coordinates ★★★

Ans. **Market**: "Meet me at 6 pm at the **7th shop in the 5th row** from the entrance": two numbers fix the shop. **Chessboard**: letters a–h and numbers 1–8 name each square; white's queen's pawn opens **d2 to d4**.



Coordinates on a chessboard

Ans. **Let's explore**: playing black with the same move, I write **d7 to d5** (black's queen's pawn moves two squares forward).

Definition ✎ **System of coordinates**: two values that fix a position exactly. The same idea, with latitude and longitude, locates any place on a map.

b) Latitudes ★★★

Definition ✎ Rotate a globe: the fixed points at top and bottom are the **North Pole** and **South Pole**; halfway between them is the **Equator**. **Latitude** measures the distance from the Equator as you travel towards a pole. A **parallel of latitude** is an imaginary east-west line parallel to the Equator, a circle round the Earth.

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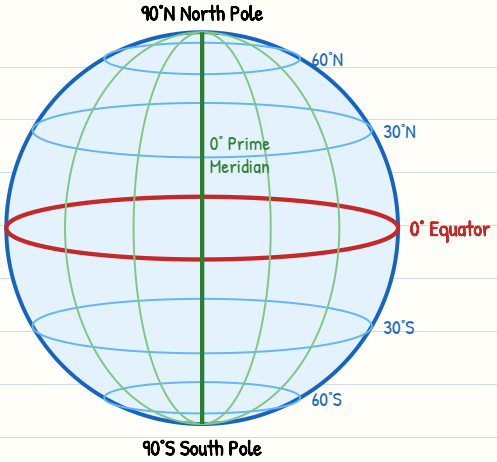


Fig. 1.3 redrawn: parallels of latitude and meridians of longitude

Fact	Value
Equator	0°; the largest parallel
North Pole / South Pole	90°N / 90°S (points, not circles)
parallels towards the poles	become smaller circles
India	about 8°N to 37°N

Latitude and climate	Climate
around the Equator	generally hot ("torrid")
moving towards a pole (latitude increases)	more moderate ("temperate")
near the poles	cold ("frigid")

Why: the Sun's rays are more direct near the Equator (you will learn in Science, with seasons).

c) Longitudes ★★★

Definition ✎ **Meridians of longitude**: half-circles from one pole to the other (the shortest path pole to pole; through Europe–Africa or Asia, the distance is the same). The Earth spins on its axis: with a lamp as the Sun, rotating a globe eastward shows morning in some places, noon, evening or night in others; so **measuring longitude also measures time**.

Definition ✎ **Prime Meridian (Greenwich Meridian)**: the reference **0° longitude**; in **1884** nations chose the meridian through **Greenwich** (London, England). Longitude = distance from the Prime Meridian travelling along the Equator, **0° to 180°**, with **E** or **W**.

Place (rounded)	Latitude	Longitude
New York	-	74°W
Delhi	29°N	77°E
Tokyo	-	140°E

Don't miss out: 180°W and 180°E are the **same** meridian, written simply **180°**. Latitude and longitude together are the two **coordinates** of a place; parallels and meridians together form the **grid** (grid lines).

Let's explore: approximate coordinates

City	Latitude	Longitude

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Mumbai	19°N	73°E
Kolkata	22.5°N	88°E
Singapore	1°N	104°E
Paris	49°N	2°E

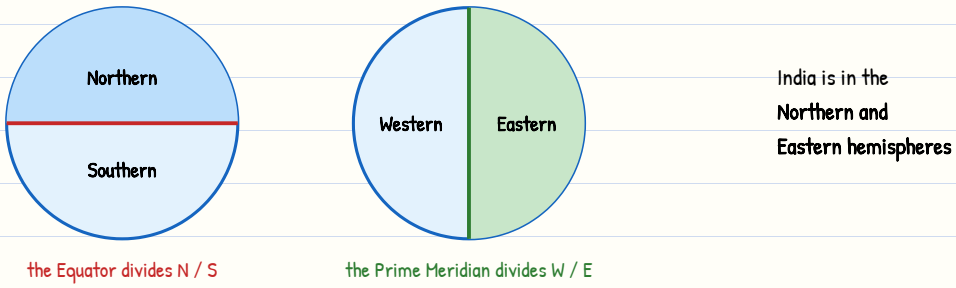


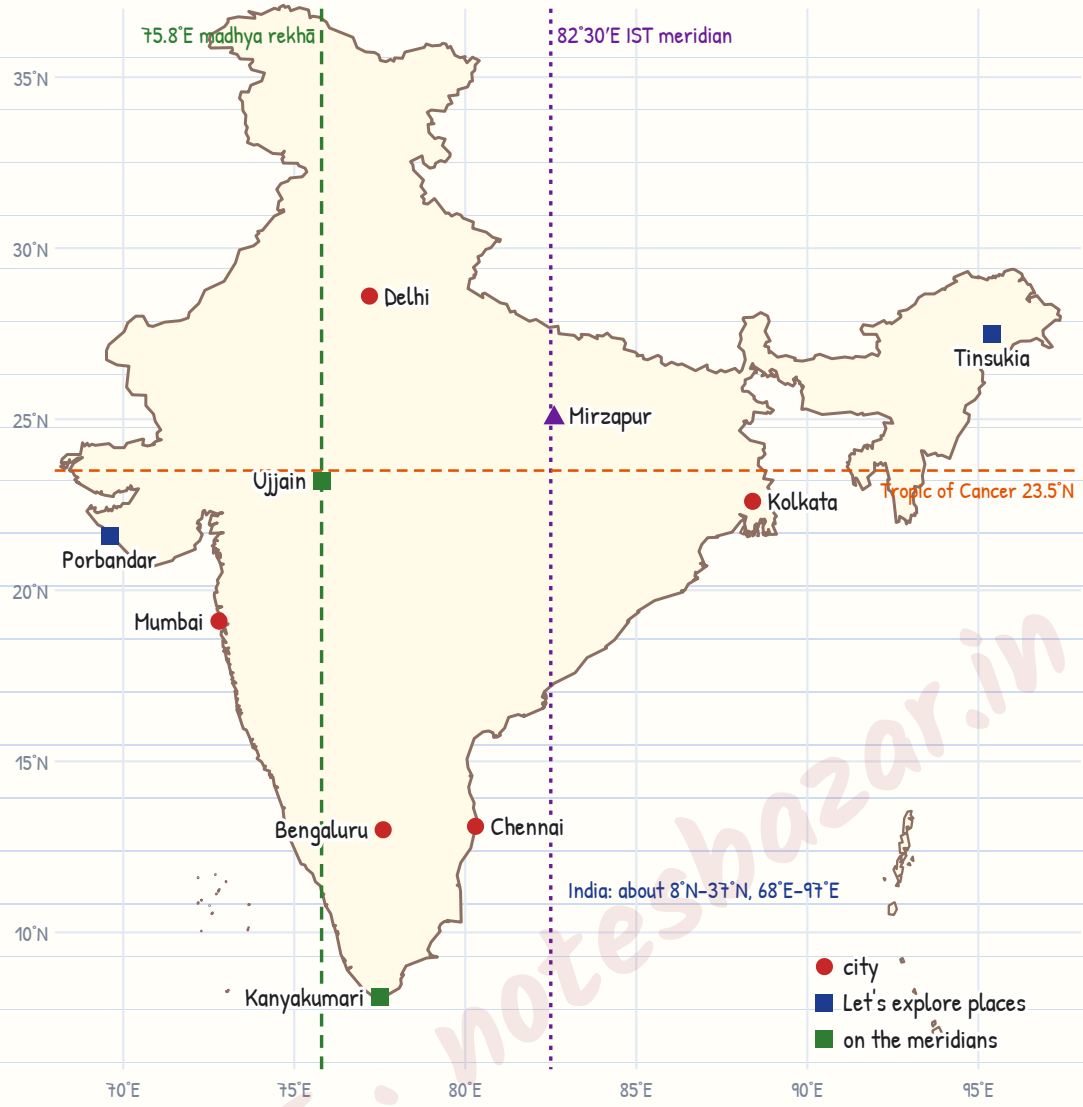
Fig. 1.4: the four hemispheres

India's own prime meridian ★★★

Don't miss out: Greenwich was not the first prime meridian. Many centuries before Europe, India had the **madhya rekhā** ("middle line") through **Ujjayinī (Ujjain)**, a famous centre of astronomy, where **Varāhamihira** worked about 1,500 years ago. Indian astronomers knew latitude, longitude and the need for a zero meridian; the Ujjayinī meridian was the reference in all Indian astronomical texts.

Ans. Fig. 1.5: ancient cities on or near this meridian (about **75.8°E**): **Kurukṣhetra, Rohitaka (Rohtak), Mālavanagara (Nagar), Ujjayinī (Ujjain), Māhiṣhmati (Maheshwar), Kumārī (Kanyakumari)**. Some lie a little away because measuring longitude needed accurate timekeeping, which was less precise then.

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India on the grid (after Fig. 1.5 and 1.6): the ancient Ujjayini meridian and the IST meridian (positions approximate)

Definition ✎ Fig. 1.6 (Survey of India): India's latitudes extend about **8°N to 37°N** and longitudes about **68°E to 97°E**. The **Tropic of Cancer (23.5°N)** passes through the middle of India.

Understanding time zones ★★★

Definition ✎ The Earth spins **west to east**, a full turn of **360° in 24 hours**: **15° per hour** (15 × 24 = 360), so **1° = 4 minutes**. Going **east** from Greenwich, add one hour of local time for each 15°; going **west**, subtract.

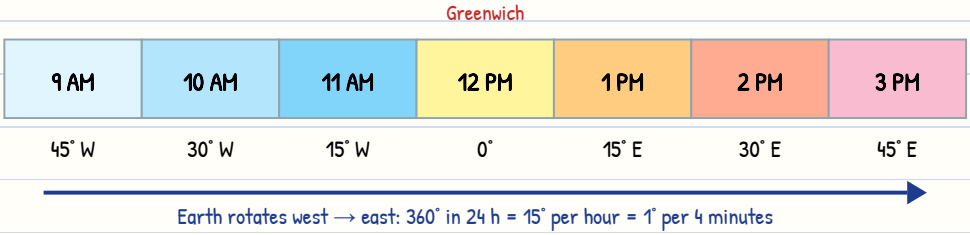


Fig. 1.7 redrawn: each 15° east adds one hour of local time; each 15° west takes one away

Ans. Let's explore: Porbandar and Tinsukia: Tinsukia (Assam) is far to the **east**, so the Sun rises and sets there much earlier; when it is dark in Tinsukia, Porbandar (Gujarat, far west) is still in daylight.

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Difference in longitude about **30°**: 30 ÷ 15 = **2 hours** of local time (Tinsukia ahead). (Precise: 95.4°E – 69.6°E ≈ 26°: about 1 h 44 min.)

Definition ✎ **Local time**: time by the Sun's position at a place (noon when the Sun is highest there). **Standard time**: one meridian's local time used by a whole country, so that clocks, trains and offices agree. **Indian Standard Time (IST)** is **5 h 30 min (5.5 h) ahead of GMT** (Greenwich Mean Time); it is the local time of **82°30'E** (near Mirzapur): 82.5 × 4 = 330 min = 5 h 30 min.

Ans. **Let's explore: local vs standard time with the two friends**: by **local** time their clocks would differ by about two hours (Tinsukia ahead), because of the Sun; but both phones show the same **IST**, the **standard** time of the whole country. So at 5:30 pm IST it is already dark in Tinsukia and still bright in Porbandar.

Time zones of the world ★★★

Definition ✎ Standard times are organised in **time zones** that roughly follow 15° bands, but their dividing lines are **not straight**: they follow **international borders** to respect each country's standard time. Numbers on the map (Fig. 1.8) are hours **added** to GMT (+) or **subtracted** (–).

Country (Fig. 1.9 examples)	Standard time
United Kingdom	GMT (0)
India, Sri Lanka	GMT + 5:30
Nepal	GMT + 5:45
Bangladesh	GMT + 6
China	GMT + 8
Japan	GMT + 9
UAE	GMT + 4
New York (USA, east)	GMT – 5

Don't miss out: large countries have several time zones: the **USA six**, **Russia 11** (crossing Russia you reset your watch **10 times**); Canada too.

Definition ✎ **International Date Line (IDL)**: roughly the **180°** meridian, opposite the Prime Meridian, where the +12 and –12 zones meet. Crossing it **eastward**: **subtract a day** (Monday → Sunday); **westward**: **add a day** (Sunday → Monday). It bends in places so that no country is split into two dates.

★ **Exam tip:** **Before we move on**: maps represent small or large areas with distance, direction and symbols; a grid of latitudes (east-west) and longitudes (pole to pole) fixes every place; longitude marks time and time zones; crossing the IDL changes the date by one day.

Questions, activities and projects: our answers

Ans. **1. Narmada estuary to Ganga estuary** (scale 2.5 cm = 500 km, so **1 cm = 200 km**): measure the straight line from the mouth of the Narmada (Gulf of Khambhat, west coast) to the mouth of the Ganga (near the Bay of Bengal, West Bengal): about **8.5 cm**. Real distance ≈ 8.5 × 200 = **about 1,700 km**. (An estuary is where a river meets the sea; your rounded value may differ slightly: about 1,700–1,800 km.)

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Ans. 2. London is on the Prime Meridian (0°); IST is based on **82°30′E**. The Earth rotates west to east, so places to the east see the Sun earlier and are **ahead**. 82.5 × 4 min = 330 min = **5 h 30 min**, so noon in London is **5:30 pm** in India.

Ans. 3. A map is small, so we cannot draw every house, road, river or temple as it looks, or write every name: **symbols** stand for them in little space. **Colours** show features at a glance (blue water, green plains and forests, yellow-brown plateaus and mountains). Both are **standard** and explained in the **key (legend)**, so anyone can read the map.

4. Eight directions from my school (example)

N	NE	E	SE	S	SW	W	NW
main road, bus stop	temple	playground	water tank	market	post office	park	hospital

Find north with a compass or the Sun (east is where it rises), then make your own table.

Ans. 5. Local time and standard time (about 120 words): Local time is the time of a place worked out from the Sun: it is 12 noon when the Sun is highest overhead there. As the Earth rotates, places on different longitudes have noon at different moments, so local time changes by **4 minutes for every degree** of longitude; towns a few hundred kilometres apart east-west would have different clock times. If every town kept its own time, timetables for trains, flights, offices and schools would be confusing. So a country chooses one meridian and uses its local time everywhere: this is **standard time**. India uses the local time of **82°30′E** (near Mirzapur) as **IST**, 5 h 30 min ahead of GMT. Thus Assam and Gujarat share one clock time, though their local times differ.

Ans. 6. Local time depends only on **longitude**, not latitude. Delhi and Bengaluru are both at about **77°E**, so the difference in local time is **almost zero**.

7. True or false, with reasons

Statement	T/F	Reason
All parallels of latitude have the same length.	F	the Equator is the longest; they shrink towards the poles, which are points
A meridian's length is half that of the Equator.	T	it runs pole to pole, half-way round the Earth; the Equator goes all the way round
The South Pole has a latitude of 90°S.	T	the poles are 90°N and 90°S
In Assam, local time and IST are identical.	F	Assam is about 92°E, about 10° east of 82°30′E: local time is about **40 minutes ahead** of IST
Lines separating time zones are identical with meridians.	F	they bend to follow country and state borders
The Equator is also a parallel of latitude.	T	it is the 0° parallel, the longest one

8. Crossword: Locating places on Earth

Across	Answer	Down	Answer
1. lets you squeeze a huge area into your map	SCALE	2. distance from the Prime Meridian	LONGITUDE
4. a convenient sphere	GLOBE	3. these two together locate a place	COORDINATES

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5. the longest parallel of latitude	EQUATOR	6. what latitudes and longitudes create	GRID
6. place the Prime Meridian is attached to	GREENWICH	7. the time we all follow in India	IST
8. so convenient to find your way	MAP	9. on top of the world	NORTH POLE
10. distance from the Equator	LATITUDE	11. abbreviation for the line where the date changes	IDL

Noodles ("Notes and Doodles"): use this space to doodle a compass rose, a globe with its grid and the 15° time strip.

Solved time sums ★★★

Question	Working	Answer
Noon at Greenwich: local time at 45°E?	45 ÷ 15 = 3 h ahead	3 pm
Noon at Greenwich: local time at 30°W?	30 ÷ 15 = 2 h behind	10 am
Difference between 68°E and 97°E	29 × 4 = 116 min	1 h 56 min
10 am GMT in India	10:00 + 5:30	3:30 pm IST
9 pm IST in London	21:00 − 5:30	3:30 pm GMT
Crossing the IDL eastward on Tuesday	subtract a day	Monday

Keywords and mistakes ★★★

Word	Meaning
map / atlas	drawing of an area seen from above / book of maps
scale	map distance that stands for a ground distance
cardinal directions	north, east, south, west
globe	sphere with a map drawn on it
latitude / parallel	distance N or S of the Equator / east-west circle
longitude / meridian	distance E or W of the Prime Meridian / pole-to-pole half-circle
grid	parallels and meridians together
local / standard time	Sun-based time of a place / one meridian's time for a country
International Date Line	about 180°; crossing it changes the date

✗ Don't do this: Common mistakes: "latitudes run north-south" (they run east-west) · "all meridians and parallels are equal" · "local time depends on latitude" · adding time when going west · "IST is the time of Delhi (77°E)" (it is 82°30′E) · "time-zone lines are straight".

Exam-style questions Exam-style

1. What is an atlas? [1]

> Ans. A book or collection of maps.

2. Latitude of the Equator? [1]

> Ans. 0°.

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3. Name the three components of a map. [2]

Ans. Distance (scale), direction, symbols.

4. Why is a globe better than a flat map? [2]

Ans. Same spherical shape as the Earth; a flat map must stretch or tear.

5. Why is the Prime Meridian called the Greenwich Meridian? [2]

Ans. In 1884 nations chose the meridian through Greenwich (London) as 0°.

6. Local time at 60°E when it is noon at Greenwich? Show working. [3]

Ans. 60 ÷ 15 = 4 h ahead: 4 pm.

7. What is the madhya rekhā? [3]

Ans. Ancient Indian prime meridian through Ujjayinī; reference in astronomy texts; Varāhamihira.

8. Explain local time, standard time and IST. Why does India need a standard time? [5]

Ans. Sun-based time of each place; one meridian for all; 82°30′E, GMT + 5:30; avoids confusion in timetables (p. 9, 11).

Case study 1: the playground map Exam-style. A playground 40 m × 30 m is drawn at 1 cm = 10 m.
(i) Length on paper? **4 cm**. [1]
(ii) Width on paper? **3 cm**. [1]
(iii) Diagonal on paper? **5 cm**. [1]
(iv) Real diagonal, with working? **5 × 10 = 50 m**. [2]

Case study 2: crossing the IDL Exam-style. A ship sails east across the 180° line on Sunday.
(i) Name the line. **International Date Line**. [1]
(ii) New day? **Saturday**. [1]
(iii) Which zones meet there? **+12 and −12**. [1]
(iv) Why does the line bend? **So no country is split into two dates**. [2]

Practice set: test yourself *Exam-style*

Try every question before looking at the answers at the end of the chapter. 40 or more out of 48 means you are ready for the test.

A. Fill in the blanks (1 mark each)

1. A collection of maps is an _____.
2. The Prime Meridian passes through _____.
3. The Earth turns _____° in one hour.
4. IST is _____ ahead of GMT.
5. Maps of India use symbols fixed by the _____.
6. The ancient Indian prime meridian passed through _____.
7. Russia has _____ time zones.
8. Parallels and meridians together form a _____.

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B. True or false? (1 mark each)

1. A meridian is a full circle.
2. The North Pole is at 90°N.
3. Thematic maps show one kind of information.
4. Going west, local time increases.
5. India lies in the Southern Hemisphere.
6. 180°E and 180°W are the same meridian.
7. Climate near the Equator is generally hot.
8. All countries have only one time zone.

C. Very short answer (1 mark each)

1. Longitude of Delhi (rounded)?
2. Who wrote the opening quote?
3. Which meridian gives IST?
4. Black's reply to d2–d4 in the book?
5. Latitude extent of India?
6. Longitude extent of India?
7. Number of time zones in the USA?
8. Which direction is between N and E?
9. What is an estuary?
10. Abbreviation of Greenwich Mean Time?

D. Short answer I (2 marks each)

1. Why can't the Earth be shown exactly on flat paper?
2. Differentiate a parallel and a meridian.
3. Why are time-zone lines not straight?
4. How does latitude affect climate?
5. What does "1 cm = 200 km" mean?
6. Name the four hemispheres and their dividing lines.
7. Why do Delhi and Bengaluru have the same local time?
8. Why is the Sun seen earlier in Assam than in Gujarat?

E. Short answer II (3 marks each)

1. Explain three kinds of maps with examples.
2. Explain coordinates with the market and the chessboard.
3. Describe the madhya rekhā and cities near it.
4. Explain why it is 5:30 pm in India at noon in London.
5. What happens when you cross the International Date Line?
6. Why do some countries have more than one time zone?

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F. Long answer (5 marks each)

1. Describe the three components of a map with examples.
2. Explain latitudes and longitudes and how they locate a place.
3. Explain how longitude is related to time, with a time strip.
4. Compare a globe and a map: uses, advantages and limits.

G. Challenge (HOTS) questions

1. A place has the same local time as Greenwich. Where can it be?
2. Why would one time for all of Russia be a problem?
3. Two cities 1,000 km apart north-south have nearly the same local time. Why?
4. Why did ancient astronomers need accurate clocks to fix longitude?

Case study 3: a cricket match abroad Exam-style. A match in London (GMT) starts at 10:30 am. (i) Time in India? [1] (ii) A match in Tokyo (GMT + 9) starts at 2 pm local: time in India? [1] (iii) Which country, India or Japan, sees sunrise first? [1] (iv) Explain your answer to (iii). [2]

My score (fill in after checking the answers)

Section	A /8	B /8	C /10	D /16	E /18	F /20	G (bonus)	Total /80
My marks								

Rough work

20 MCQs

1. Main components of a map
   (a) title, page, ink (b) colour, paper, size (c) distance, direction, symbols (d) globe, atlas, scale
2. A book of maps
   (a) atlas (b) globe (c) grid (d) legend
3. A map showing countries and boundaries
   (a) none (b) physical (c) thematic (d) political
4. Scale 2.5 cm = 500 km means 1 cm =
   (a) 500 km (b) 200 km (c) 250 km (d) 100 km
5. Cardinal directions do not include
   (a) north (b) northeast (c) east (d) west
6. Body that fixes map symbols in India
   (a) IMD (b) ISRO (c) NCERT (d) Survey of India
7. Latitude of the Equator
   (a) 0° (b) 90° (c) 180° (d) 23.5°
8. Latitude of the South Pole
   (a) 180° (b) 0° (c) 90°S (d) 66.5°S
9. The longest parallel
   (a) all are equal (b) Tropic of Cancer (c) Arctic Circle (d) Equator
10. Meridians are
    (a) full circles (b) half-circles from pole to pole (c) parallel to the Equator (d) of different lengths
11. Prime Meridian fixed in
    (a) 1500 (b) 1947 (c) 1884 (d) 1984

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12. Delhi's longitude (rounded)
(a) 77°E (b) 74°W (c) 140°E (d) 29°N

13. Time for 15° of longitude
(a) 4 minutes (b) 1 hour (c) 15 minutes (d) 24 hours

14. Time for 1° of longitude
(a) 15 minutes (b) 1 hour (c) 4 minutes (d) 1 minute

15. IST is ahead of GMT by
(a) 5 h (b) 6 h (c) 4 h 30 min (d) 5 h 30 min

16. Noon at Greenwich: local time at 30°E
(a) 2 pm (b) 10 am (c) 2 am (d) 12 noon

17. The ancient madhya rekhā passed through
(a) Ujjayinī (b) Delhi (c) Kolkata (d) Chennai

18. Country with 11 time zones
(a) China (b) USA (c) India (d) Russia

19. Crossing the IDL westward you
(a) subtract a day (b) add a day (c) add an hour (d) change nothing

20. India lies in the
(a) Northern and Western (b) Southern and Western (c) Northern and Eastern Hemispheres (d) Southern and Eastern

1 (c) · 2 (a) · 3 (d) · 4 (b) · 5 (b) · 6 (d) · 7 (a) · 8 (c) · 9 (d) · 10 (b) · 11 (c) · 12 (a) · 13 (b) · 14 (c) · 15 (d) · 16 (a) · 17 (a) · 18 (d) · 19 (b) · 20 (c)

Assertion–Reason (6)

(a) Both true, R explains A. (b) Both true, R does not explain A. (c) A true, R false. (d) A false, R true.

1. A: Places east of Greenwich are ahead in time. R: The Earth rotates from west to east.
2. A: All parallels are equal in length. R: The Equator is the longest parallel.
3. A: India needs a standard time. R: Local times differ across India's longitudes.
4. A: A globe represents the Earth better than a flat map. R: The globe and the Earth have the same shape.
5. A: Assam's local time equals IST. R: IST is based on 82°30′E.
6. A: Symbols save space on maps. R: The Survey of India was set up by the government.

Key: 1 (a) · 2 (d) · 3 (a) · 4 (a) · 5 (d) · 6 (b)

Answers to the practice set

A. 1. atlas 2. Greenwich 3. 15 4. 5 h 30 min 5. Survey of India 6. Ujjayinī (Ujjain) 7. 11 8. grid

B. 1. F (half-circle) 2. T 3. T 4. F 5. F 6. T 7. T 8. F

C. 1. 77°E 2. Āryabhaṭa 3. 82°30′E 4. d7–d5 5. about 8°N–37°N 6. about 68°E–97°E 7. six 8. northeast 9. where a river meets the sea 10. GMT

D. 1. it is a sphere; flattening tears or stretches it

2. parallel: east-west circle, measures latitude; meridian: pole-to-pole half-circle, measures longitude

3. they follow country borders

4. hot near the Equator, temperate in between, cold near the poles

5. each cm on the map is 200 km on the ground

6. Northern/Southern (Equator); Eastern/Western (Prime Meridian)

7. same longitude (77°E)

8. Assam is farther east; the Earth turns west to east

E. 1. p. 3 table 2. p. 5 3. p. 8 4. p. 11 Q2 5. p. 10 6. they are very wide east-west (USA, Russia)

F. 1. p. 3–4 2. p. 6–7 3. p. 9 4. globe: true shape, hard to carry, little detail; map: easy, detailed, but distorted

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G. 1. anywhere on the Prime Meridian (0°), e.g. in Ghana or Spain 2. the Sun would rise at very different clock times across the country 3. local time depends on longitude, not latitude 4. longitude was found from time differences, so clocks had to be exact

Case study 3. (i) 4 pm IST (ii) 2 pm – 3:30 = 10:30 am IST (iii) Japan (iv) it is farther east (about 140°E); the Earth turns west to east

Last-night summary

- Maps: physical, political, thematic; components: distance (scale), direction (N, E, S, W and NE …), symbols (Survey of India).
- The globe has a grid of parallels (latitude, 0° Equator to 90°N/S) and meridians (longitude, 0° Greenwich to 180°E/W).
- India: about 8°N–37°N, 68°E–97°E; ancient madhya rekhā through Ujjayinī.
- 360° in 24 h: 15° = 1 h, 1° = 4 min; east is ahead; IST (82°30′E) = GMT + 5:30.
- Time-zone lines follow borders; Russia 11 zones, USA 6; crossing the IDL (about 180°) changes the date.

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