30 Worked Answers and Explanations

Notes for SHS • Topic 85 • Educational resource • 2026

1. Define weather data.

Records or estimates of atmospheric variables at specified locations/times.

Check units, valid-day denominators and the source identity before generalising.

2. Differentiate weather and climate.

Weather is shorter-term conditions; climate describes long-term weather statistics.

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3. Name three weather variables.

Temperature, precipitation and humidity, among others.

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4. What is historical weather data?

Weather-related measurements or estimates for past dates; source type must be named.

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5. Name two authoritative providers.

NASA POWER for gridded historical estimates; NOAA GHCN-Daily for station records.

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6. What is a Pandas DataFrame?

A table-like data structure with labelled rows and columns.

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7. Why use a datetime index?

Correct chronological sorting, alignment, resampling and gap detection.

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8. Why is -999 often a sentinel?

A provider may use -999 for unavailable values; verify metadata before replacing.

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9. How are Fahrenheit and Celsius related?

C = (F - 32) × 5/9. Do not mix scales.

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10. What does a precipitation value mean?

A daily amount in mm/day or equivalent, subject to actual source definitions.

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11. Average maximum in the seven-day example?

(24+26+25+27+23+22+28)/7 = 25.00 °C.

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12. Average minimum in the seven-day example?

(14+15+13+16+14+12+18)/7 = 102/7 ≈14.57 °C.

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13. Temperature range on 2024-01-01?

24-14=10 °C.

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14. Highest daily maximum in the mini example?

28 °C, 2024-01-07, fictional.

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15. Lowest daily minimum in the mini example?

12 °C, 2024-01-06, fictional.

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16. Total seven-day precipitation?

0+1.5+0+4+2+0.5+0=8.0 mm.

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17. Wet days with precipitation >0?

Four fictional days.

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18. Wet days with precipitation ≥1mm?

Three fictional days.

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19. If 3 of 366 dates are missing precipitation, percentage?

3/366×100≈0.82% missing; 363/366 valid.

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20. Monthly temperature mean versus precipitation total?

Average valid daily T2M; sum valid daily precipitation with coverage reported.

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21. How should 20240101 be parsed?

pd.to_datetime(value,format="%Y%m%d") rather than free-form guessing.

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22. How convert Fahrenheit 68°F?

(68-32)×5/9=20°C.

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23. Should missing precipitation be treated as 0?

No. Zero means measured/estimated none; missing means unknown.

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24. Pandas monthly mean temperature syntax?

weather["MeanTemp_C"].resample("MS").mean()

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25. What does rolling(7,min_periods=7) mean?

A seven-position mean requiring seven nonmissing observations; initial days/gaps remain NaN.

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26. Which graphs fit temperature and precipitation?

Chronological line for daily T; period bars for monthly precipitation; histogram for distribution.

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27. Does one warmer year prove climate change?

No; longer baselines and attribution methods are needed.

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28. What does the NASA JSON payload require before DataFrame creation?

Check properties.parameter, all required fields, YYYYMMDD keys, units and -999 fill.

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29. Why retain an unusual heat or wet event?

It may be genuine; investigate metadata and data quality rather than automatically discard.

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30. What must the weather report contain?

Source/product, point, dates, time standard, units, coverage, methods, verified results, figures and limitations.

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