

The ArcGIS Quiz Bank

ON THIS PAGE

- [The ArcGIS Quiz Bank](#)
 - [Quiz: Volume A - Foundations](#)
 - [Quiz: Volume B - ArcGIS Online Mastery](#)
 - [Quiz: Volume C - Data Creation and Management](#)
 - [Quiz: Volume D - Spatial Analysis](#)
 - [Quiz: Volume E - ArcGIS Pro Deep Dive](#)
 - [Quiz: Volume F - Apps and Field Operations](#)
 - [Quiz: Volume G - Automation and Administration](#)
 - [Quiz: Volume H — Practice and Reference](#)

The ArcGIS Quiz Bank

Two hundred questions across the eight Compendium volumes — multiple choice, short answer, and judgment scenarios — with full answer keys and chapter references.

Quiz: Volume A - Foundations

This quiz covers Compendium Chapters 1-5: how GIS represents the world, which ArcGIS product fits which job, coordinate systems and projections, cartographic design, and finding trustworthy data. It tests judgment, not memorized menus. Work through

all 25 questions before checking the Answer Key; each answer cites the chapter that treats the topic in depth.

Questions

1. You need to map soil pH across a 500-square-kilometer agricultural region, where the value changes gradually and continuously across the landscape. Which data model is the better fit?

- A. Vector points, one per soil sample
- B. Vector polygons, one per farm parcel
- C. Raster, with each cell holding a pH value
- D. A table with no geometry, joined to county boundaries

2. A colleague says "we should store the road network as a raster so we can do analysis on it." What is the strongest reason to push back?

- A. Rasters cannot be displayed in web maps
- B. Roads are discrete linear features with attributes and connectivity, which vector lines represent directly and rasters lose
- C. Raster files are always larger than vector files
- D. Rasters cannot store any attribute information

3. Which of these is an attribute, as GIS uses the term?

- A. The latitude of a fire hydrant
- B. The shape of a parcel boundary
- C. The install date recorded for a fire hydrant feature
- D. The projection of the layer the hydrant is stored in

4. Your organization has ArcGIS Online. A field crew needs to collect inspection records at utility poles, including photos, while standing next to each pole. Which product is designed for exactly this?

- A. ArcGIS Pro
- B. ArcGIS Field Maps

- C. ArcGIS StoryMaps
- D. ArcGIS Dashboards

5. A teammate wants to run a large drive-time analysis in ArcGIS Online and asks "is this free since we already pay for our subscription?" What is the accurate answer?

- A. Yes, all analysis in ArcGIS Online is included in the subscription
- B. No, ArcGIS Online analysis is billed to a separate credit card each run
- C. Some ArcGIS Online operations, including certain analysis and premium services, consume credits from the organization's balance, so it is worth checking the estimated cost before running a big job
- D. Drive-time analysis is only available in ArcGIS Enterprise

6. Which statement best captures the division of labor between ArcGIS Online and ArcGIS Pro?

- A. Pro is for making maps; Online is for storing files
- B. Online is the cloud platform for hosting, sharing, and lightweight analysis; Pro is the desktop application for heavy data work, advanced analysis, and print-quality cartography
- C. Online replaces Pro entirely for organizations created after a certain date
- D. Pro is only used by administrators

7. A geographic coordinate system (GCS) differs from a projected coordinate system (PCS) in that a GCS:

- A. Uses linear units like meters, while a PCS uses degrees
- B. Defines locations with angular units (latitude/longitude) on a model of the earth's surface, while a PCS flattens those locations onto a plane with linear units
- C. Is only used for web maps
- D. Cannot be used to store data, only to display it

8. You add a shapefile to a map and it draws off the coast of Africa near coordinates (0, 0) instead of in your city. What is the most likely cause?

- A. The data is corrupt and must be re-downloaded
- B. The layer has a missing or wrongly defined coordinate system, so the software is interpreting its coordinate numbers incorrectly
- C. The basemap is in the wrong projection
- D. The shapefile format does not support projections

9. What is the difference between *defining* a coordinate system and *projecting* data?

- A. There is no difference; the terms are interchangeable
- B. Defining changes the coordinate values; projecting only changes the label
- C. Defining corrects the metadata label to match what the coordinates already are; projecting mathematically transforms the coordinate values into a different system
- D. Defining is done in ArcGIS Online, projecting in ArcGIS Pro

10. You are measuring parcel areas for a legal survey in a single county. Which is the best coordinate system choice?

- A. WGS84 geographic coordinates, because they are the global standard
- B. Web Mercator, because it is what basemaps use
- C. A local projected coordinate system appropriate to the region, such as the applicable State Plane or UTM zone, chosen to minimize distortion for that area
- D. Whatever the first layer in the map happens to use

11. A colleague measures the "area" of Greenland on a Web Mercator web map and announces it is about the size of Africa. What do you tell them?

- A. The measurement is correct; Greenland really is that large
- B. Web Mercator preserves shape locally but grossly inflates area at high latitudes, so area measurements taken in it are unreliable, especially far from the equator
- C. The web map must have a broken measure tool
- D. Greenland's size cannot be measured in any projection

12. Two layers in your map are in different datums (for example, one NAD27 and one NAD83-based). Features that should align are offset by a consistent distance. What

resolves this properly?

- A. Manually dragging one layer until it looks right
- B. Applying an appropriate geographic (datum) transformation when the data is projected or displayed
- C. Deleting the projection information from both layers
- D. Converting both layers to a raster

13. In cartographic design, "visual hierarchy" means:

- A. Ordering layers alphabetically in the contents pane
- B. Deliberately making the most important content most prominent so a reader's eye lands on the map's subject before the supporting elements
- C. Using at least five font sizes on every layout
- D. Placing the legend above the map

14. You are mapping median household income by county. Which color scheme is appropriate?

- A. A qualitative scheme of unrelated hues, one random color per county
- B. A sequential scheme running light to dark, so darker means higher income
- C. Pure red and pure green only
- D. A rainbow scheme so every value gets a vivid color

15. When would a diverging color scheme be the right choice instead of a sequential one?

- A. When the data is categorical, like land use types
- B. When the data has a meaningful midpoint or break, such as change above versus below zero, and you want the two directions to read differently
- C. Whenever there are more than five classes
- D. Never; diverging schemes are considered bad practice

16. Which of these is a genuine reason to avoid relying on red versus green to distinguish two important categories?

- A. Red and green print poorly on all printers
- B. A meaningful share of readers have red-green color vision deficiency and cannot reliably tell the two apart
- C. Web browsers render red and green inconsistently
- D. Red and green cannot be used together in ArcGIS symbology

17. You are mapping the count of crimes per police district as a filled-polygon (choropleth) map. The districts vary hugely in area and population. What is the standard critique of mapping raw counts this way, and the usual fix?

- A. Counts are fine; no change needed
- B. Large or populous districts will look "worse" simply because they contain more people or land; normalize the counts, for example as a rate per capita or per area
- C. Choropleth maps cannot show crime data; switch to a 3D scene
- D. The fix is to use a brighter color scheme

18. A map you are reviewing shows city labels overlapping each other, a legend listing every one of 14 layers including the basemap, and a title in the same size type as the attribution text. Which single design principle, applied consistently, would address all three problems?

- A. Always use serif fonts
- B. Reduce and prioritize: show, label, and explain only what serves the map's purpose, at a prominence matching its importance
- C. Add a north arrow
- D. Increase the map's extent

19. What is the Living Atlas of the World, in practical terms?

- A. A paid third-party data marketplace unaffiliated with Esri
- B. A curated collection of ready-to-use layers, maps, and apps published and vetted within the ArcGIS ecosystem, searchable from Map Viewer and Pro
- C. A desktop extension for terrain analysis
- D. Another name for the basemap gallery

20. You find a "Flood Zones" feature layer through a general portal search. Before using it in a decision-making map, which item-page details matter most for judging whether to trust it? (Choose the best set.)

- A. The thumbnail image and the number of comments
- B. The owner/publisher, when it was last updated, its description and source documentation, and its terms of use
- C. Whether it has a colorful default symbology
- D. Whether the title is in all caps

21. Two candidate datasets cover the same theme. One is national-scale, generalized, and current; the other is local, detailed, but five years old. For a site-selection study inside one city, how should you think about the choice?

- A. Always take the newer dataset; currency beats everything
- B. Always take the detailed dataset; resolution beats everything
- C. Weigh fitness for use: judge whether the theme changes fast enough that a five-year-old snapshot is misleading, and whether the generalized data is too coarse for site-level decisions; the answer depends on the data's subject, not a fixed rule
- D. Merge the two datasets so the errors average out

22. *Short answer.* In one or two sentences, explain why the same real-world phenomenon (say, elevation) can legitimately be represented as either vector or raster, and what governs which you pick.

23. *Short answer.* Your manager asks why the organization should not just give every staff member the highest-privilege account type. Give two practical reasons grounded in how ArcGIS Online organizations work.

24. *Short answer.* Explain in plain language why every projected map of the whole world must distort something, and name the kinds of properties that trade off against each other.

25. *Scenario.* You publish a web map for a public meeting. A resident emails: "Your map is wrong, my house is shown across the street from where it actually is." The parcel

data came from the county; the basemap is a standard imagery basemap. What do you check first, and why?

Answer Key

1. C. Soil pH is a continuous surface: it has a value everywhere and changes gradually, which is the raster model's core strength. Vector points would only capture sample locations, and parcels would impose artificial boundaries on a continuous phenomenon. — Compendium Chapter 1 (How GIS Thinks)

2. B. Roads are discrete features with identity, attributes, and network connectivity; rasterizing destroys all three and degrades geometry to cell approximations. The other options are simply false. — Compendium Chapter 1 (How GIS Thinks)

3. C. Attributes are the descriptive, non-spatial information stored about a feature, like an install date. Latitude and shape are geometry, and the projection belongs to the layer's spatial reference, not the feature's attribute table. — Compendium Chapter 1 (How GIS Thinks)

4. B. Field Maps is Esri's field-data-collection app: it captures features with photo attachments on a mobile device, online or offline. Pro is desktop software, StoryMaps is narrative publishing, Dashboards is monitoring. — Compendium Chapter 2 (The ArcGIS Ecosystem); field apps in depth in Chapter 30

5. C. ArcGIS Online meters certain operations, including some analysis tools and premium content, against the organization's credit balance. The responsible habit is to check a large job's estimated credit cost before running it. — Compendium Chapter 2 (The ArcGIS Ecosystem)

6. B. This is the working mental model: Online is the sharing and hosting platform with lighter-weight analysis and apps; Pro is the heavyweight desktop tool for data creation, advanced geoprocessing, and layout-quality cartography. They complement rather than replace each other. — Compendium Chapter 2 (The ArcGIS Ecosystem)

7. B. A GCS locates positions with angular coordinates on a spheroidal model of the earth; a PCS applies a projection to flatten those positions into planar linear units. The units are the giveaway: degrees signal geographic, meters or feet signal projected. — Compendium Chapter 3 (Coordinate Systems and Projections)

- 8. B.** Landing near (0, 0) off West Africa — "null island" — is the classic symptom of a missing or misdefined coordinate system: the coordinate numbers are fine, the interpretation instructions are wrong or absent. — Compendium Chapter 3 (Coordinate Systems and Projections); see also Chapter 39 (Troubleshooting Encyclopedia)
- 9. C.** Defining fixes the label so it matches the coordinates as they already exist; projecting recalculates the coordinates into a different system. Applying the wrong operation makes things worse: defining data that actually needs projecting just relabels bad numbers. — Compendium Chapter 3 (Coordinate Systems and Projections)
- 10. C.** For legal-grade local measurement you want a projected system designed for that region — a State Plane or UTM zone — where distortion across a single county is negligible. WGS84 degrees are angular and unsuitable for planar area math, and Web Mercator distorts area badly. — Compendium Chapter 3 (Coordinate Systems and Projections)
- 11. B.** Web Mercator inherits the Mercator design: local shapes look right, which is what makes it workable for tiled web display, but area is inflated more and more toward the poles — exactly where Greenland sits. Any area comparison made in it is untrustworthy; measure in an equal-area projection (or with a geodesic measure tool) instead. In reality Africa is roughly fourteen times Greenland's size. — Compendium Chapter 3 (Coordinate Systems and Projections)
- 12. B.** A consistent offset between datasets in different datums is the signature of a missing or wrong geographic (datum) transformation. The fix is to apply the appropriate transformation during projection or display, not to nudge geometry by hand, which corrupts the data. — Compendium Chapter 3 (Coordinate Systems and Projections)
- 13. B.** Visual hierarchy is deliberate prominence: the map's subject should be the strongest visual element, the basemap and supporting elements quieter. It is about controlling where the reader's eye goes first, not about layer ordering or element placement rules. — Compendium Chapter 4 (Cartographic Design)
- 14. B.** Income is quantitative and ordered, so a sequential light-to-dark ramp lets readers decode "darker = more" instantly. Qualitative hues destroy the order; rainbow

schemes imply false category breaks and mislead readers about magnitude. —
Compendium Chapter 4 (Cartographic Design)

15. B. Diverging schemes exist for data with a meaningful middle — change versus no change, above versus below an average — where two hues fan out from a neutral midpoint. Using one on data without a real midpoint invents a break that is not in the data. — Compendium Chapter 4 (Cartographic Design)

16. B. Red-green color vision deficiency is common enough that a map depending on that distinction fails for a meaningful share of its audience. Choose colorblind-safe pairs or reinforce the distinction with another visual variable such as shape or pattern. — Compendium Chapter 4 (Cartographic Design)

17. B. Raw counts in a choropleth reward whatever is big: more land or more people yields more of almost anything. Normalizing — crimes per 1,000 residents, or per square kilometer — turns the map into a comparison of intensity rather than of district size. — Compendium Chapter 4 (Cartographic Design); styling mechanics in Chapter 7 (Styling and Smart Mapping)

18. B. All three defects are failures of prioritization: labels competing instead of being thinned and ranked, a legend explaining things the reader does not need, and a title that does not assert its importance. The cure is one editorial pass driven by the map's purpose. — Compendium Chapter 4 (Cartographic Design)

19. B. The Living Atlas is Esri's curated, vetted collection of authoritative layers, imagery, basemaps, and apps, browsable directly from Map Viewer and Pro. It is usually the first place to look before hunting through open portals or building data yourself. — Compendium Chapter 5 (Finding Data)

20. B. Trust comes from provenance and maintenance: who published it, how recently it was updated, what the description says about sources and methods, and what the terms of use permit. Thumbnails, comments, and default styling say nothing about reliability. — Compendium Chapter 5 (Finding Data)

21. C. This is the fitness-for-use judgment at the heart of data sourcing: neither currency nor resolution wins categorically. Ask how fast the phenomenon changes, what spatial precision the decision requires, and whether either dataset's weakness would actually change the outcome. — Compendium Chapter 5 (Finding Data)

22. Sample answer. Elevation can be stored as raster cells (a continuous surface of values) or as vector contours and spot heights (discrete features approximating that surface); both are valid abstractions of the same reality. Intended use governs the pick — surface analysis favors raster, cartographic display may favor vector — along with precision, storage, and the tools you plan to run. — Compendium Chapter 1 (How GIS Thinks)

23. Sample answer. Any two of: higher-privilege user types cost more per member, so blanket assignment wastes budget; broad privileges let untrained users delete shared content, publish credit-consuming services, or change organization settings; and least-privilege assignment of user types and roles makes auditing simpler. — Compendium Chapter 2 (The ArcGIS Ecosystem); administration detail in Chapter 34

24. Sample answer. The earth is curved and a map is flat; no flattening can preserve every geometric property at once, so every world projection distorts something. The trade-offs are among area, shape, distance, and direction — you pick a projection by what your map needs to preserve. — Compendium Chapter 3 (Coordinate Systems and Projections)

25. Sample answer. First verify the parcel layer's coordinate system and datum transformation against the basemap: a consistent street-width offset is the classic symptom of a transformation mismatch, not a data error. Also remember imagery basemaps have their own positional accuracy, and county parcel lines are legal boundaries rather than survey-grade overlays on photos — a modest misalignment may be inherent and worth documenting rather than "fixing" by editing geometry. — Compendium Chapter 3 (Coordinate Systems and Projections) and Chapter 5 (Finding Data); symptom lookup in Chapter 39 (Troubleshooting Encyclopedia)

Quiz: Volume B - ArcGIS Online Mastery

This quiz covers Compendium Chapters 6 through 10: Map Viewer mechanics, styling and smart mapping, Arcade, pop-up configuration, and the hosted feature layer lifecycle. Questions 1-15 are multiple choice, 16-21 are short answer, and 22-25 are

scenarios that ask what you would do or check first. Answers with explanations and chapter references follow at the end.

Questions

1. You style a hosted feature layer inside a web map in Map Viewer and save the map. A colleague later adds the same layer to a brand-new map. What do they see?
 - A. Your new styling, because styling always saves back to the layer
 - B. The layer's own default styling, because your changes were saved in your map, not on the layer item
 - C. An error prompting them to choose a style before the layer will draw
 - D. No symbology at all until an administrator assigns one
2. Which statement best describes the relationship between a web map and the hosted feature layers it contains?
 - A. The map contains a private copy of every layer's data
 - B. The map stores references to the layer items plus its own configuration overrides; the data stays with the layers
 - C. The map and its layers form a single item that must always be shared together
 - D. Deleting the map also deletes the layers it used
3. You want a county map shaded by what share of households lack internet access. Your layer has a count of households without access and a total household count. What is the right styling move?
 - A. Style by the raw count using a counts-and-amounts color style
 - B. Style by the count and normalize (divide) by total households so you are mapping a rate
 - C. Use a single-symbol location style and rely on labels for the numbers
 - D. Use heat map styling on the county polygons
4. Your numeric field holds a change score where values above zero mean improvement and below zero mean decline. Which approach communicates this best?

- A. A single-hue sequential ramp from light to dark
- B. Unique values with a distinct color for each number
- C. An above-and-below theme with a diverging color ramp centered on zero
- D. A heat map weighted by the score

5. Heat map styling is the right choice when:

- A. You have a few dozen important points that users need to identify individually
- B. You have polygons carrying a rate attribute
- C. You have many overlapping points and the pattern of density matters more than any single feature
- D. You need to report exact counts per administrative area

6. In Arcade, what does the profile (pop-up, labeling, visualization, and so on) primarily determine?

- A. The visual formatting of whatever the expression returns
- B. Which global variables and functions are available and where and when the expression runs
- C. Whether the expression is allowed to run at all in ArcGIS Online
- D. Which version of the Arcade language syntax is used

7. Given the expression `IIf(IsEmpty($feature.status), "Unknown", Proper($feature.status))`, what does it return for a feature whose status field is null?

- A. null, because the field has no value
- B. "Unknown", because `IsEmpty` catches the null and the true branch is returned
- C. A runtime error, because you cannot pass null to `Proper`
- D. An empty string

8. What is the key operational difference between using an Arcade expression to drive styling and calculating a new field to hold the same value?

- A. There is no practical difference

- B. The expression is evaluated on the fly when features draw, so it always reflects current data; a calculated field stores a static value until someone recalculates it
- C. Expressions are always faster than reading a stored field
- D. Calculated fields cannot be produced with Arcade

9. What does changing a field's alias actually change?

- A. The stored field name in the underlying database
- B. Only the display name shown in pop-ups, tables, and styling interfaces; the underlying field name and data are untouched
- C. The field's data type, if the alias implies a different one
- D. Both the field name and its values

10. You want a pop-up title that reads "Site 42 - Active", combining a site number field and a status field. What is the cleanest approach?

- A. Add a new text field to the layer and calculate the combined string into it
- B. Build the title with field placeholders or an Arcade expression in the pop-up configuration
- C. Rename the layer so the title text appears automatically
- D. Turn off the pop-up title and use a label instead

11. What is a hosted feature layer view?

- A. A full copy of the data that synchronizes with the original on a schedule
- B. A separate item that reads the same underlying data as its parent layer but can carry its own filters, visible fields, sharing level, and editing settings
- C. A cached snapshot of the layer used only for faster drawing
- D. A saved map extent focused on the layer

12. You need to replace last year's data with this year's in a hosted feature layer that dozens of maps and apps reference. What is the best approach?

- A. Delete the layer and publish a new one with the same name

- B. Overwrite or update the existing layer so its item ID stays the same and everything that references it keeps working
- C. Publish the new data as a second layer and email everyone the new link
- D. Build a new web map and share that instead

13. A field crew edits a hosted feature layer all day, and the public needs to see the data read-only. What is the right pattern?

- A. Share the editable layer publicly and trust that nobody edits it
- B. Maintain two separate copies of the data, one editable and one public
- C. Keep the editable parent layer private to the crew and share a non-editable view of it with the public
- D. Enable editing only during business hours

14. What does a bookmark in Map Viewer store?

- A. The layer visibility and styling in effect when it was created
- B. A saved map extent or viewpoint you can return to
- C. A snapshot copy of the whole map
- D. The filter set applied to each layer

15. Your data is heavily skewed: a few very large values and many small ones. Equal interval classification puts nearly everything into one class. Which method guarantees features are spread across classes by placing roughly the same number of features in each?

- A. Equal interval with more classes
- B. Quantile
- C. Standard deviation
- D. Manual breaks placed at round numbers

16. Short answer: In Arcade, what does the global variable `$feature` represent, and in what kinds of contexts is it available?

17. Short answer: Give two reasons to create a hosted feature layer view for a second audience instead of exporting a copy of the data for them.
18. Short answer: Labels and pop-ups can both display attribute values. What is the key difference in when each appears, and what kind of content belongs in each?
19. Short answer: What does normalization do when styling a layer, and give one example of a map that is misleading without it.
20. Short answer: What is a visible range (scale-dependent visibility) on a layer, and why would you set one on a dense point layer?
21. Short answer: A colleague deleted a hosted feature layer and republished a corrected version from the same source file. Every map that used the layer is now broken. Explain why this happened and what they should have done instead.
22. Scenario: You publish a choropleth of total crimes per neighborhood. The largest, most populous neighborhoods are darkest, and stakeholders conclude those areas are the most dangerous. What is the problem, and what do you change first?
23. Scenario: Your pop-up uses an Arcade expression that combines several fields into a sentence. For most features it works, but for some the pop-up element shows nothing at all. What do you check first in the expression?
24. Scenario: A public web map backed by a hosted feature layer with hundreds of thousands of points takes a very long time to draw at the full extent. Users are complaining. What do you check or change first?
25. Scenario: You spent an hour perfecting a layer's symbology inside one web map. A teammate adds the same layer to a new map and gets default symbols, then asks you to "fix the broken layer." What actually happened, and what do you do so future maps pick up your styling?

Answer Key

1. **B.** Styling configured inside a map is saved as part of that map's configuration; the layer item keeps its own defaults unless you deliberately save the styling back to the layer itself. Compendium Chapter 6 (Map Viewer Complete Reference).

2. **B.** A web map is essentially a specification: references to layer items plus per-map overrides such as styling, filters, and pop-up configuration. The data always lives with the hosted layers. Compendium Chapter 6 (Map Viewer Complete Reference).
3. **B.** A raw count of households without access mostly shows where the households are. Dividing by total households converts the count into a rate that is comparable across counties of different sizes. Compendium Chapter 7 (Styling and Smart Mapping).
4. **C.** An above-and-below theme with a diverging ramp makes the meaningful midpoint visible: two hues diverge from zero, so improvement and decline read instantly. A sequential ramp hides the sign change. Compendium Chapter 7 (Styling and Smart Mapping).
5. **C.** Heat maps deliberately trade individual feature identity for a density surface. They mislead with few points and cannot answer per-feature questions, but they excel at showing where many overlapping points concentrate. Compendium Chapter 7 (Styling and Smart Mapping).
6. **B.** The profile defines the execution context: which globals exist (such as `$feature`), which functions are legal, and where and when the expression is evaluated. An expression valid in one profile may not be valid in another. Compendium Chapter 8 (Arcade from Zero to Fluent).
7. **B.** `IsEmpty` returns true for a null value, so `IIf` returns the true-branch value, "Unknown". This test-then-substitute pattern is the standard null guard in Arcade. Compendium Chapter 8 (Arcade from Zero to Fluent).
8. **B.** An expression is evaluated at draw time, so it automatically reflects edits to the underlying data; a calculated field is a stored snapshot that goes stale until it is recalculated. Choose based on whether the value must track live data. Compendium Chapter 8 (Arcade from Zero to Fluent).
9. **B.** An alias is display-only. It changes what people see in pop-ups, tables, and styling pickers, while the true field name (which code and expressions may reference) and the stored values are unchanged. Compendium Chapter 9 (Pop-ups, Fields, and Labels).

10. **B.** The pop-up title accepts field placeholders and Arcade expressions, so you can compose the string without touching the data schema. Calculating a new field just to feed a title creates a stale value to maintain. Compendium Chapter 9 (Pop-ups, Fields, and Labels).
11. **B.** A view is a separate item pointing at the same underlying data as its parent. Because it carries its own filters, field visibility, sharing, and editing settings, it lets one dataset serve multiple audiences without duplication. Compendium Chapter 10 (Hosted Feature Layers).
12. **B.** Maps and apps reference layers by item ID. Overwriting or updating the existing layer preserves that ID, so everything downstream keeps working; deleting and republishing mints a new ID and orphans every reference. Compendium Chapter 10 (Hosted Feature Layers).
13. **C.** This is the canonical view pattern: the private parent stays editable for the crew, and the public sees a view with editing disabled. One dataset, two access postures, no copies to keep in sync. Compendium Chapter 10 (Hosted Feature Layers).
14. **B.** A bookmark is a saved viewpoint (extent) you can jump back to. It does not capture layer visibility, styling, or filters in effect when it was made. Compendium Chapter 6 (Map Viewer Complete Reference).
15. **B.** Quantile classification places an equal count of features in each class, so skewed data still spreads across the ramp. Be aware it can make very different values look similar, so check where the breaks land before publishing. Compendium Chapter 7 (Styling and Smart Mapping).
16. `$feature` represents the single feature currently being evaluated: its attributes (accessed as `$feature.fieldname`) and, in most profiles, its geometry. It is available in per-feature contexts such as pop-ups, labeling, visualization, and form or rule expressions, where the engine runs the expression once per feature. Compendium Chapter 8 (Arcade from Zero to Fluent).
17. First, a view stays live against the same underlying data, so the second audience never sees a stale copy and you have nothing to re-export. Second, the view carries independent settings, so you can filter rows, hide sensitive fields, disable editing, or

share at a different level without touching the parent or duplicating storage. Compendium Chapter 10 (Hosted Feature Layers).

18. Labels draw on the map for many features at once and are always visible, so they should carry one short identifying value. A pop-up appears on demand for a single feature the user clicked, so it can carry richer content: multiple fields, expressions, formatted text, charts, images, and links. Compendium Chapter 9 (Pop-ups, Fields, and Labels).
19. Normalization divides the attribute you are styling by another attribute (or a constant), converting a raw count into a rate or density before it is classified and colored. Example: a map of total population per county mostly shows which counties are large or urban; dividing by area to map population density reveals the actual settlement pattern. Compendium Chapter 7 (Styling and Smart Mapping).
20. A visible range restricts the scales at which a layer draws, for example only when zoomed in past a certain level. On a dense point layer it prevents an unreadable smear of overlapping symbols at small scales and avoids asking the service to send and draw every feature at once, which also helps performance. Compendium Chapter 6 (Map Viewer Complete Reference) and Chapter 10 (Hosted Feature Layers).
21. Maps reference layers by item ID, not by name. Deleting the layer destroyed that ID, and republishing created a brand-new item with a new ID, so every existing reference broke. They should have used the overwrite or update workflow on the existing item, which replaces the data while preserving the ID that maps and apps point to. Compendium Chapter 10 (Hosted Feature Layers).
22. The map is styled by raw counts, so it largely reflects where people are, not where risk is high; big populous neighborhoods will almost always be darkest. First change: normalize, styling by a rate such as crimes per thousand residents, then re-read the pattern before drawing any conclusions. Compendium Chapter 7 (Styling and Smart Mapping).
23. Check how the expression handles null or empty fields. One unguarded null in a string-building expression can blank the entire result for that feature. Test the expression against a feature you know has missing values, and wrap inputs with

`IsEmpty` checks or a default-value function so the expression degrades gracefully. Compendium Chapter 8 (Arcade from Zero to Fluent).

24. Check whether the map really needs to draw every point at the full extent. The first levers are display-side: set a visible range so individual points appear only at larger scales, enable clustering or another aggregation for zoomed-out views, and apply a filter if only a subset matters. Then review the layer's performance and optimization settings on its item page. Compendium Chapter 10 (Hosted Feature Layers) and Chapter 6 (Map Viewer Complete Reference).
25. Nothing is broken. Your symbology was saved into your web map's configuration, so it travels with that map only; the layer item still has its default styling, which is what the new map picked up. Save the styling to the layer itself, in the layer's item page or via the option to save the layer from Map Viewer, so it becomes the default every future map inherits. Compendium Chapter 6 (Map Viewer Complete Reference) and Chapter 10 (Hosted Feature Layers).

Quiz: Volume C - Data Creation and Management

This quiz covers Compendium Chapters 11 through 15: import paths and their traps, schema and domain design judgment, editing workflows, data quality, and raster fundamentals. Questions 1-15 are multiple choice, 16-21 are short answer, and 22-25 are scenarios. Work through all 25 before checking the Answer Key.

Questions

1. You have a CSV of customer locations with street address, city, and state columns, but no coordinates. What happens when you add it to ArcGIS Online as a hosted layer?
 - A. It cannot be mapped until you add latitude and longitude columns yourself
 - B. ArcGIS Online offers to locate the rows by geocoding the address fields, an operation that consumes credits
 - C. The rows are automatically placed at the centroid of each state

- D. The file can only be added as a standalone table with no way to create points

2. Which set of files must be zipped together for a shapefile upload to succeed and land in the right place on the map?

- A. The .shp file alone
- B. The .shp and .prj files only
- C. At minimum the .shp, .shx, and .dbf files, with the .prj included so the coordinate system is known
- D. Any combination of files, as long as the folder is zipped

3. You export a hosted feature layer to shapefile and field names like `inspection_status_code` come back mangled. Why?

- A. A bug in the ArcGIS Online export tool
- B. The shapefile's dBASE table format limits field names to ten characters, so longer names are truncated
- C. Shapefiles do not support text fields at all
- D. The export replaced field names with their aliases

4. You need to move a feature class from ArcGIS Pro to ArcGIS Online while preserving its domains, attachments, and long field names. Which upload format is the right choice?

- A. Zipped shapefile
- B. CSV export
- C. Zipped file geodatabase
- D. KML

5. A `Condition` field should only ever contain the values Good, Fair, or Poor. Which schema tool enforces this at data entry?

- A. A range domain
- B. A coded value domain
- C. A field alias

- D. An attribute index

6. What field type should store a US ZIP code, and why?

- A. Integer, because ZIP codes are numbers
- B. Double, to allow ZIP+4 values
- C. Text, because ZIP codes can have leading zeros and are identifiers, not quantities
- D. Date, because ZIP codes are assigned chronologically

7. After a hosted feature layer is published and in daily use, which of these can you change freely without disrupting the layer?

- A. A field's data type
- B. A field's name
- C. The layer's geometry type
- D. A field's alias

8. Which schema change is the most disruptive to make after a hosted feature layer is published?

- A. Adding a brand-new field
- B. Changing an existing field's data type
- C. Editing the value list of an existing coded value domain
- D. Changing a field's alias

9. Members of your organization can see a hosted feature layer in Map Viewer, but the editing tools are unavailable. What is the most likely cause?

- A. Web browsers cannot edit hosted feature layers; editing requires ArcGIS Pro
- B. Editing has not been enabled in the layer's item page settings
- C. The layer must first be converted to a hosted feature layer view
- D. The layer contains a coded value domain, which blocks editing

10. What does editor tracking record on a feature layer?

- A. A complete geometry history that lets you roll any feature back to any prior state

- B. Who created and who last edited each feature, and when
- C. The IP address and device of every editor
- D. A full backup copy of the layer before each edit session

11. What is the main purpose of a topology in ArcGIS Pro?

- A. To make layers draw faster in a map
- B. To define and validate spatial-relationship rules, such as polygons must not overlap or lines must connect
- C. To generalize geometry for small-scale display
- D. To reproject data on the fly

12. Which requirement calls for an attribute rule rather than a domain?

- A. Restrict a status field to one of three approved values
- B. Restrict a pipe diameter field to a numeric range
- C. Reject any inspection record whose follow-up date is earlier than its inspection date
- D. Restrict a count field to whole numbers

13. An elevation product for your study area is offered at two cell sizes, one half the size of the other. What is the consequence of choosing the finer one?

- A. File size stays about the same because the extent is unchanged
- B. Detail increases, and the cell count roughly quadruples along with storage and processing cost
- C. Detail decreases because each cell now holds less information
- D. Nothing; cell size and resolution are unrelated

14. A rainfall raster contains cells marked NoData. What does NoData mean?

- A. Zero rainfall fell in those cells
- B. No measurement exists for those cells, which is different from measuring zero
- C. The raster is corrupted in those areas

- D. Those cells will always render as black and cannot be changed

15. In multiband satellite imagery, what does a band represent?

- A. A different time period, one band per capture date, in every case
- B. A separate measurement of the same ground area, typically a different wavelength range such as red, green, blue, or near-infrared
- C. A zoom level cached for faster display
- D. A compression layer that reduces file size

16. (*Short answer*) Name two practical limitations of the shapefile format that make a file geodatabase the better exchange format for anything beyond a quick handoff.

17. (*Short answer*) Explain the difference between a field's name and its alias, and why the distinction matters when you design a schema.

18. (*Short answer*) You manage fire hydrants, and each hydrant is inspected many times over its life. Describe how you would structure the data instead of adding fields like `inspection1` , `inspection2` , `inspection3` to the hydrant layer.

19. (*Short answer*) What is snapping, and why should it be on when you edit features that are supposed to connect, like water mains or parcel boundaries?

20. (*Short answer*) When is raster the right data model instead of vector? Give one example of a phenomenon better represented as a raster.

21. (*Short answer*) What are raster pyramids (overviews), and what problem do they solve?

22. (*Scenario*) You geocode a CSV of several thousand addresses. The layer publishes without errors, but a large cluster of points is stacked at a single location near the center of one city. What do you check first?

23. (*Scenario*) Field crews have been entering a hydrant's condition as free text, and the layer now contains "Good", "GOOD", "gd", and "fine". What is the schema fix, and what do you do about the existing records?

24. (Scenario) Editors maintaining a parcel layer in the web have introduced sliver gaps and small overlaps between neighboring parcels. Management wants the boundaries clean. What do you do?

25. (Scenario) You bring in an elevation raster and its statistics report a minimum value that is an enormous negative number; a hillshade built from it looks bizarre around the edges. What do you check first?

Answer Key

1. B. ArcGIS Online can geocode address fields when you add a CSV, and batch geocoding that you save as a layer consumes credits, so know the row count before you run it. Compendium Chapter 11 (Creating Data); credits are covered in Compendium Chapter 2 (The ArcGIS Ecosystem).

2. C. A shapefile is a bundle of sidecar files: the .shp, .shx, and .dbf are the minimum, and without the .prj the coordinate system is unknown and the data can land in the wrong place. Compendium Chapter 11 (Creating Data), with the coordinate consequences in Compendium Chapter 3 (Coordinate Systems and Projections).

3. B. The shapefile's ten-character field-name limit silently truncates longer names, which is one of several reasons it is a legacy format rather than a working format. Compendium Chapter 11 (Creating Data).

4. C. A zipped file geodatabase preserves domains, attachments, long field names, and true null values through publishing; shapefile and CSV lose most of that, and KML is a display format. Compendium Chapter 11 (Creating Data).

5. B. A coded value domain restricts a field to an explicit list of allowed values and presents editors a pick list instead of a text box. A range domain is for numeric minimum-maximum bounds. Compendium Chapter 12 (Schema Design).

6. C. ZIP codes are identifiers, not quantities: storing them as numbers drops leading zeros (turning 02134 into 2134) and invites meaningless math. Text is correct. Compendium Chapter 12 (Schema Design).

7. D. An alias is a display label, so changing it is cosmetic and safe at any time. Field names, types, and geometry type are structural and range from painful to impossible to

change in place. Compendium Chapter 12 (Schema Design).

8. B. You cannot change an existing field's data type in place on a hosted layer; the practical workaround is adding a new field, calculating values across, and retiring the old one, which disturbs maps, pop-ups, and apps that reference it. Adding fields and editing domain lists are routine by comparison. Compendium Chapter 12 (Schema Design), with hosted-layer behavior in Compendium Chapter 10 (Hosted Feature Layers).

9. B. Editing is off by default on hosted feature layers and must be switched on in the layer's item page settings; sharing controls who sees it, but the editing setting controls whether anyone can change it. Compendium Chapter 13 (Editing Workflows in Web and Pro).

10. B. Editor tracking stamps each feature with creator, creation date, last editor, and last edit date. It is an accountability trail, not a version history or undo mechanism. Compendium Chapter 13 (Editing Workflows in Web and Pro).

11. B. A topology encodes spatial-relationship rules (no gaps, no overlaps, endpoints must connect) and validates the data against them, flagging violations as errors you can review and fix. Compendium Chapter 14 (Data Quality).

12. C. Comparing two fields requires logic, which is what attribute rules provide; domains can only constrain a single field to a list or range. Options A, B, and D are handled by domains and field types. Compendium Chapter 14 (Data Quality), with domains in Compendium Chapter 12 (Schema Design).

13. B. Halving the cell size means four cells where there was one, so detail improves while storage and processing cost grow roughly fourfold. Resolution is always a trade against size — and note that the detail must exist in the source; resampling an existing coarse raster to smaller cells quadruples the cell count without adding any information. Compendium Chapter 15 (Imagery and Rasters).

14. B. NoData records the absence of a measurement, which is fundamentally different from a measured value of zero; treating them as the same corrupts statistics and analysis. Compendium Chapter 15 (Imagery and Rasters).

- 15. B.** Each band is a separate measurement of the same ground, usually a different wavelength range; combining bands into composites (like color-infrared) is how imagery reveals things such as vegetation health. Compendium Chapter 15 (Imagery and Rasters).
- 16.** Any two of: field names truncate at ten characters; no true null values (empty becomes zero or a blank string); limited date/time support; a file size ceiling; one feature class per shapefile with no domains, subtypes, or attachments. Compendium Chapter 11 (Creating Data).
- 17.** The name is the permanent internal identifier used by queries, expressions, and code; the alias is the human-friendly label shown in tables and pop-ups. Because names are hard to change later and aliases are free to change, choose short, stable, machine-friendly names and put the readable wording in the alias. Compendium Chapter 12 (Schema Design).
- 18.** Use a related table: one hydrant layer, one inspections table, joined by a key field (hydrant ID) in a one-to-many relationship. Each inspection becomes a new row rather than a new field, so the schema never runs out of room and history is queryable. Compendium Chapter 12 (Schema Design).
- 19.** Snapping pulls your editing cursor onto existing vertices and edges within a tolerance, so new geometry actually coincides with what it should touch. Without it, features that look connected are microscopically apart, which breaks network connectivity and creates slivers. Compendium Chapter 13 (Editing Workflows in Web and Pro).
- 20.** Raster fits phenomena that have a value at every location rather than discrete objects with boundaries: continuous surfaces like elevation, temperature, and rainfall, categorical surfaces like land cover, and imagery itself. Elevation is the classic example. Compendium Chapter 15 (Imagery and Rasters), with the underlying models in Compendium Chapter 1 (How GIS Thinks).
- 21.** Pyramids are precomputed reduced-resolution copies of a raster stored alongside the full-resolution data. When you are zoomed out, the software draws the appropriate coarse level instead of resampling millions of cells on the fly, which is the difference between instant and sluggish display. Compendium Chapter 15 (Imagery and Rasters).

22. Check the geocoding match results first. A stack of points at one spot is the signature of addresses that failed to match at street level and fell back to a coarser match, such as the city itself. Review match scores and match levels, fix or standardize the failing addresses, and rematch them rather than accepting the fallback locations. Compendium Chapter 11 (Creating Data).

23. Add a coded value domain to the condition field so future entries come from a pick list, then clean the existing records by recalculating the free-text variants to the approved codes (select each variant, calculate to the correct value). The domain prevents recurrence; the recalculation fixes history — adding a domain does not retroactively correct values that already violate it. Compendium Chapter 12 (Schema Design) for the domain, Compendium Chapter 14 (Data Quality) for the cleanup.

24. Copy the parcels into a geodatabase in ArcGIS Pro — geodatabase topology cannot be built directly on a hosted feature layer — and build a topology with rules like "must not overlap" and "must not have gaps", validate, then work through the flagged errors with the topology editing tools before pushing the cleaned data back. Going forward, enforce snapping during edits and periodically re-validate as a QA step, since web editing alone will not police shared boundaries. Compendium Chapter 14 (Data Quality), with the editing mechanics in Compendium Chapter 13 (Editing Workflows in Web and Pro).

25. Check whether the dataset's placeholder value for missing measurements is being treated as real data instead of NoData. Elevation products commonly fill voids with an extreme sentinel value; until it is defined as NoData, every statistic and derived surface is contaminated by it. Set the NoData value, recompute statistics, and rebuild the derived layers. Compendium Chapter 15 (Imagery and Rasters).

Quiz: Volume D - Spatial Analysis

This quiz covers Compendium Chapters 16-20: proximity and overlay, statistical and pattern analysis, network analysis, terrain and raster analysis, and space-time analysis. It tests judgment — choosing the right tool, reading outputs honestly, and catching the

mistakes that make analysis results look better than they are. Work through all 25 questions before checking the answer key. If you miss a question, the key points you to the chapter that treats the topic in depth.

Questions

1. You need a list of every parcel within 500 feet of a proposed pipeline route. Which approach fits?

- a) Dissolve the parcels, then measure to the pipeline
- b) Buffer the pipeline at 500 feet, then select the parcels that intersect the buffer
- c) Union the parcels with the pipeline layer
- d) Merge the pipeline into the parcel layer and recalculate geometry

2. You overlay a soils layer with a parcels layer and need the output polygons to carry attributes from *both* inputs. Which tool?

- a) Clip
- b) Erase
- c) Intersect
- d) Merge

3. You need to answer "how many crimes occurred in each police beat?" and attach that count to the beat polygons. What is the most direct approach?

- a) Buffer each crime point and count overlaps
- b) A spatial join (or summarize-within operation) that counts the crime points falling in each beat
- c) Union the beats with the crime points
- d) Run a near-distance calculation from each crime to each beat centroid

4. A hot spot analysis (Getis-Ord style) of burglary counts shows a cluster of statistically significant "hot" cells downtown. Which statement is the honest reading?

- a) More burglaries happen downtown than anywhere else in the city

- b) High burglary values cluster together downtown in a way unlikely to be random chance, relative to the study area as a whole
- c) Burglary is increasing downtown
- d) The cause of the burglaries is located downtown

5. A global Moran's I test on median income by tract returns significant positive spatial autocorrelation. What have you actually learned?

- a) The exact locations where high-income tracts cluster
- b) That similar income values cluster somewhere in the data — but not where
- c) That income is randomly distributed
- d) That high-income tracts repel each other

6. A colleague maps total customer counts per county to identify "the strongest markets" and the biggest counties light up. What is the core problem?

- a) County polygons are too coarse for any analysis
- b) Raw counts largely track where people live; the map needs normalization by population or households before it says anything about market strength
- c) Customer counts cannot be joined to polygons
- d) The color ramp choice is wrong

7. Dispatchers want to know, for each incoming incident, which fire station can reach it fastest by road. Which network analysis solver fits?

- a) Buffer rings around each station
- b) Closest facility
- c) Straight-line near-distance from incident to station
- d) Service area polygons drawn once per station

8. A 10-minute drive-time service area around a clinic covers far less ground on the far side of a river than a 10-minute circle would suggest. What explains this?

- a) The solver failed and should be rerun

- b) The network solver respects actual crossings, one-way streets, and travel speeds, so the river is only crossable at bridges — straight-line distance ignores all of that
- c) Service areas always shrink near water due to a default rule
- d) The clinic point was placed on the wrong side of the river

9. A report states "slopes of 60" with no units. Which statement about slope units is correct and shows why the omission matters?

- a) Percent slope can exceed 100, while slope in degrees cannot exceed 90 — so 60 means very different steepness depending on the unit
- b) Degrees and percent are the same below 90
- c) Slope in degrees can exceed 90 on cliffs
- d) Percent slope is always exactly double the degree value

10. You are running a viewshed for a proposed fire lookout in forested terrain. You have a bare-earth DEM and a surface model (DSM) that includes tree canopy. Which is the right call?

- a) Use the bare-earth DEM; trees are temporary
- b) Use the DSM (or the DEM plus explicit surface offsets), because bare earth ignores the trees that actually block the view and will overstate visibility
- c) Average the two rasters
- d) Use whichever has the smaller file size

11. You combine a fine-resolution slope raster (derived from a detailed DEM) with a very coarse precipitation raster in map algebra. What is true of the result?

- a) The output inherits the fine resolution, so precision is preserved
- b) The output is only as reliable as the coarsest input; the fine spatial detail in the result is partly an illusion
- c) The tools will refuse to combine rasters of different cell sizes
- d) Coarse rasters become more accurate when resampled to smaller cells

12. Before combining slope (degrees), distance to roads (meters), and land cover (classes) into a single suitability score, what must you do?

- a) Convert everything to vector first
- b) Reclassify or rescale each raster to a common suitability scale so the values are comparable before weighting and combining
- c) Multiply the rasters directly; the units cancel out
- d) Project the rasters to a geographic coordinate system

13. A colleague reruns your kernel density map of incidents and the pattern looks dramatically different — smoother, with fewer peaks. The data did not change. What did they most likely change?

- a) The output file format
- b) The search radius (bandwidth) or cell size
- c) The layer name
- d) The map projection label

14. An emerging hot spot analysis labels an area an "intensifying hot spot." What does that mean?

- a) The area was a hot spot only in the final time step
- b) The area has been a statistically significant hot spot for most of the time steps, and the intensity of clustering is increasing over time
- c) The area alternates between hot and cold
- d) The area is hot but the trend is unknown

15. Your incident timestamps were recorded in local time, but the layer's time settings treat them as UTC. What is the practical consequence?

- a) Nothing; time zone is a display preference
- b) Every event shifts by several hours — possibly across midnight into the wrong day — corrupting time-of-day and day-of-week patterns
- c) The time slider stops working
- d) Only events near the date line are affected

- 16. (Short answer)** Explain why a hot spot map of raw incident counts can mislead, and name what you should normalize by before rerunning it.
- 17. (Short answer)** A colleague buffers points stored in a geographic coordinate system (decimal degrees) by "500" and gets bizarre results. Explain what went wrong and what to do instead.
- 18. (Short answer)** What is the edge (boundary) effect in density or cluster analysis, and name one way to reduce its influence.
- 19. (Short answer)** Two analysts solve routes on the same street network and get different drive times. Name two solver or network settings that could explain the difference.
- 20. (Short answer)** Why must slope and aspect be derived from the DEM itself and never from a hillshade raster?
- 21. (Short answer)** An overlay shows that most reported disease cases fall inside the floodplain. Why can you *not* conclude that the floodplain causes the disease, and what would you examine next?
- 22. (Scenario)** A colleague presents: "8,000 households are within our 15-minute delivery zone," derived from a fixed-distance buffer around the store. The city is split by a river with only two bridges, and the store sits near the bank. What do you check or do first?
- 23. (Scenario)** A colleague ran a hot spot analysis on roughly forty points, got one significant cluster, and is about to tell leadership "we've statistically proven where the problem concentrates." What do you check first before that claim goes out?
- 24. (Scenario)** A colleague's viewshed from a proposed tall communications tower shows the entire valley as visible. They ran it on a bare-earth DEM with default settings. What do you check first?
- 25. (Scenario)** A colleague's space-time analysis of service calls shows a massive spike at exactly midnight on the first of every month, and they claim a real monthly cycle in demand. What do you check first?

Answer Key

1. **b** — Buffer creates the 500-foot zone; a select-by-location or intersect against it returns the affected parcels. Dissolve, union, and merge answer different questions entirely. See Compendium Chapter 16 (Proximity and Overlay).
2. **c** — Intersect keeps only the overlapping area and carries attributes from both inputs into the output. Clip cuts geometry to a boundary but keeps only the input layer's attributes. See Compendium Chapter 16 (Proximity and Overlay).
3. **b** — A spatial join or summarize-within counts points per polygon and writes the result to the polygon table in one operation. The other options are indirect or wrong for a count-by-area question. See Compendium Chapter 16 (Proximity and Overlay).
4. **b** — Hot spot statistics identify where high values cluster more than chance would predict; they say nothing about trend, cause, or absolute maxima. Options a, c, and d all overclaim. See Compendium Chapter 17 (Statistical and Pattern Analysis).
5. **b** — Global statistics summarize the whole dataset with a single number: clustering exists, somewhere. Locating the clusters requires a local statistic (local Moran's I, hot spot analysis). See Compendium Chapter 17 (Statistical and Pattern Analysis).
6. **b** — Counts follow population: big counties have more of everything. Normalize (customers per thousand households, penetration rate) before calling anywhere a strong market. See Compendium Chapter 17 (Statistical and Pattern Analysis).
7. **b** — Closest facility finds the nearest facility to each incident measured along the network by travel time, which is exactly the question. Buffers and straight-line distance ignore the road network; a static service area answers "who can I reach," not "who reaches me fastest." See Compendium Chapter 18 (Network Analysis).
8. **b** — This is the entire point of network analysis: travel happens along streets, through bridges, obeying one-ways and speeds. The lopsided polygon is the honest answer; the circle is the fiction. See Compendium Chapter 18 (Network Analysis).
9. **a** — Degrees top out at 90 (vertical), while percent slope (rise over run, times 100) passes 100 at 45 degrees and keeps climbing. Sixty percent is a steep hillside — roughly 31 degrees — while 60 degrees is near-cliff terrain of well over 100 percent. The same

number describes very different ground, so always state units. See Compendium Chapter 19 (Terrain and Raster Analysis).

10. b — Visibility is blocked by what is actually there, and in forest that means canopy. A bare-earth viewshed systematically overstates what the lookout can see. See Compendium Chapter 19 (Terrain and Raster Analysis).

11. b — Resampling a coarse raster to small cells manufactures no new information; each fine cell just inherits the coarse value. Report and interpret the result at the coarsest input's level of detail. See Compendium Chapter 19 (Terrain and Raster Analysis).

12. b — Degrees, meters, and land cover codes are not comparable numbers; adding or weighting them raw produces arithmetic nonsense. Reclassify each input to a shared suitability scale first, then weight and combine. See Compendium Chapter 19 (Terrain and Raster Analysis).

13. b — Kernel density output is highly sensitive to bandwidth and cell size: a larger search radius smooths peaks away, a smaller one fragments them. Any density map should state its parameters, and conclusions should survive reasonable parameter changes. See Compendium Chapter 17 (Statistical and Pattern Analysis).

14. b — The emerging hot spot categories combine persistence (how many time steps were significant) with trend (is clustering strengthening or weakening). "Intensifying" means persistently hot — including recently — and getting hotter. See Compendium Chapter 20 (Space-Time Analysis).

15. b — Time-enabled layers interpret timestamps according to their declared time zone. A wrong declaration shifts every event by the offset, so "2 a.m. incidents" may really be evening incidents and daily aggregations split across the wrong dates. See Compendium Chapter 20 (Space-Time Analysis).

16. Raw counts mostly reflect where the underlying population (or road traffic, or housing) is, so the "hot spots" are often just the busiest places. Normalize by an exposure measure — population, households, vehicle miles, business counts — so the statistic measures rates, not presence of people. See Compendium Chapter 17 (Statistical and Pattern Analysis).

17. In a geographic coordinate system the units are degrees, so "500" meant 500 degrees — or, if the software silently assumed something, an unpredictable distance that also distorts with latitude. Buffer in a projected coordinate system appropriate to the area, or use a geodesic buffer option that computes true ground distance. See Compendium Chapter 16 (Proximity and Overlay) and Compendium Chapter 3 (Coordinate Systems and Projections).

18. Points near the study-area boundary have real neighbors that fall outside your data, so density and cluster statistics near edges are computed from artificially incomplete neighborhoods and are usually understated. Reduce it by acquiring data beyond the boundary and analyzing a buffered extent, or at minimum flag edge zones as less reliable. See Compendium Chapter 17 (Statistical and Pattern Analysis).

19. Any two of: the impedance attribute (travel time vs. distance, and which speed assumptions feed it); restrictions (one-way streets, turn restrictions, vehicle type); barriers added to one analysis but not the other; U-turn policy; time-of-day or traffic settings. Same network, different settings, different answers — so document solver settings with the result. See Compendium Chapter 18 (Network Analysis).

20. A hillshade stores illumination values for display — brightness under a simulated sun — not elevation. Computing slope on it measures the gradient of shading, which is meaningless terrain-wise; all terrain derivatives must come from the elevation model itself. See Compendium Chapter 19 (Terrain and Raster Analysis).

21. Spatial coincidence is not causation: the floodplain may simply contain more people, older housing, or better case reporting, and cases were counted rather than rated. Next, compute rates against population in and out of the floodplain, check for confounders, and test whether the association survives — and even then you have association, not mechanism. See Compendium Chapter 17 (Statistical and Pattern Analysis) and Compendium Chapter 16 (Proximity and Overlay).

22. Check whether straight-line distance is standing in for travel time. A buffer treats the river as crossable everywhere; with only two bridges, households on the far bank may be well outside 15 minutes of actual driving. Rebuild the zone as a network service area using drive time, then recount the households — expect the number to drop, especially across the river. See Compendium Chapter 18 (Network Analysis).

23. Check whether the analysis had enough data to support the claim. Cluster statistics on a few dozen points are fragile: verify the point count against the tool's guidance, test whether the "cluster" survives reasonable changes to scale, aggregation, and neighborhood parameters, and ask whether the data represent all events or only the reported subset. If the result only appears under one parameter combination, it is not a finding you take to leadership. See Compendium Chapter 17 (Statistical and Pattern Analysis).

24. Check the observer offset and the surface. Default settings add little or no observer height, so the analysis may have ignored the tower's height entirely — and a bare-earth DEM ignores every tree and building that would block sightlines. Rerun with the observer offset set to the tower height and a surface model (or offsets) that represents canopy and structures; the too-clean full-valley result will almost certainly lose area once real obstructions enter the surface. See Compendium Chapter 19 (Terrain and Raster Analysis).

25. Check for placeholder timestamps before believing the pattern. A spike at exactly midnight on the first of the month is the signature of missing or defaulted time values — records with an unknown time stored as midnight, or unknown dates stored as the first — or of batch data entry stamped at load time. Pull the raw records behind the spike; if they share an identical timestamp or a default value, exclude or repair them and rerun. Also confirm the time zone handling while you are in there. See Compendium Chapter 20 (Space-Time Analysis).

Quiz: Volume E - ArcGIS Pro Deep Dive

This quiz covers Compendium Chapters 21 through 25: Pro projects and the interface, geoprocessing and its environment settings, the symbology and labeling engines, layouts and map series, and ModelBuilder. It tests judgment, not menu memorization. Answer every question before checking the key. Where an answer surprises you, the chapter reference tells you where the full treatment lives.

Questions

1. A colleague emails you their `.aprx` file and nothing else. When you open it, every layer shows a broken-source icon. Why?

- A. The `.aprx` is corrupted and must be recovered
- B. An `.aprx` stores references to data, not the data itself, and the referenced paths do not exist on your machine
- C. `.aprx` files can only be opened on the machine that created them
- D. The project needs to be re-licensed before layers will draw

2. You run a geoprocessing tool and accept the default output path without reading it. Where does the output go?

- A. The folder containing the input data
- B. A temporary directory that is emptied when you close Pro
- C. The project's default geodatabase
- D. Nowhere; it is held in memory until you explicitly export it

3. You set an Extent environment at the project level, a different extent on a model, and a third extent on one tool inside that model. Which extent does that tool honor when the model runs?

- A. The project-level extent, because it is the broadest scope
- B. The model-level extent, because models isolate their tools
- C. The tool-level extent, because the most local setting wins
- D. Whichever of the three was set most recently

4. Which of these describes the classic "silent effect" of the Extent environment?

- A. The tool fails with an explicit extent error
- B. The tool pauses and asks you to confirm the processing extent
- C. The tool succeeds, but only features intersecting the extent are processed, so the output is quietly incomplete
- D. Nothing; Extent affects raster tools only

5. You set the Output Coordinate System environment to a projected state plane system, then run tools against layers stored in a geographic coordinate system. What happens?

- A. The tools fail because the coordinate systems do not match
- B. Outputs are created in the state plane system; inputs are projected on the fly during processing and are not themselves changed
- C. The input datasets are permanently reprojected in place
- D. The setting affects only how the map draws, not what tools produce

6. What is the Snap Raster environment for?

- A. Snapping vector vertices to raster cell centers during editing
- B. Forcing output raster cell alignment to match a reference raster, so cells from different analyses stack exactly
- C. Rounding raster cell values to the nearest integer
- D. Capping the maximum size of output rasters

7. The Cell Size environment is set coarser than an input raster's native resolution. What is the silent effect on a tool that processes that raster?

- A. None until you export the result
- B. The output is resampled to the coarser cell size, losing detail with no warning
- C. The tool fails with a resolution mismatch error
- D. Only the on-screen display quality changes

8. When is unclassed (continuous) color symbology a better choice than graduated colors?

- A. When the attribute is categorical
- B. When you want the map to show a smooth continuum without imposing arbitrary class breaks on the reader
- C. When the layer has very few features
- D. When the attribute field contains text

9. A road layer uses a two-layer symbol: dark casing under a lighter fill. At intersections, casings from one road cut across the fills of connecting roads. What Pro capability fixes this?

- A. Increasing the map's reference scale
- B. Enabling symbol layer drawing, so all casings draw beneath all fills across the whole layer
- C. Converting the roads to a raster layer
- D. Splitting the layer into one layer per road class

10. What distinguishes the Maplex Label Engine from the Standard label engine?

- A. Maplex works only in web maps
- B. Maplex offers much finer placement control - placement strategies, offsets, stacking, conflict resolution - at some drawing-performance cost
- C. Maplex automatically converts all labels to annotation
- D. The Standard engine supports more fonts

11. What does saving a layer file (`.lyrx`) actually preserve?

- A. The layer's data, packaged for sharing
- B. The layer's properties - symbology, labeling, definition query - plus a pointer to the data source, but not the data itself
- C. Only the color scheme
- D. A static image snapshot of the layer

12. In a layout, what is a map frame?

- A. A decorative border around the page
- B. The layout element that displays a map; several frames can show the same map or different maps, each at its own extent
- C. The printable boundary of the page
- D. A locked view of the map that cannot be navigated

13. What drives page generation in a spatial map series?

- A. A grid of page-sized tiles computed automatically from the map extent
- B. The bookmarks saved in the map
- C. An index layer - the series creates one page per feature, zoomed to that feature
- D. A list of scales you type into the series settings

14. In ModelBuilder, data flagged as intermediate is:

- A. Always deleted, even while you are editing the model
- B. Kept when you run the model inside the ModelBuilder view, but cleaned up when the model runs as a geoprocessing tool
- C. Written to the project home folder for safekeeping
- D. Automatically added to the active map

15. Setting a model variable as a parameter (the P badge) does what?

- A. Protects the variable from accidental deletion
- B. Exposes it in the model's tool dialog so users supply their own value at run time
- C. Converts the variable into a Python expression
- D. Turns the variable into a precondition

16. (Short answer) Name two geoprocessing environment settings that can silently change a tool's output without producing any error or warning, and state the effect of each.

17. (Short answer) You delete a layer from a map in your project and save the project. What happens to the underlying data, and why?

18. (Short answer) What is a label class, and give one reason you would create more than one for a single layer.

19. (Short answer) What is dynamic text in a layout, and give one example of where it earns its keep.

20. (Short answer) In ModelBuilder, what does writing a variable name between percent signs (for example `%Name%`) inside a parameter value do? Give one practical use.

- 21.** (Short answer) What is the practical difference between running a model from inside the ModelBuilder editing view and running it from its tool dialog in the Geoprocessing pane?
- 22.** (Scenario) You clip a statewide parcel layer to a county boundary. The tool reports success, but the output is missing parcels that are clearly inside the county. What do you check first?
- 23.** (Scenario) You hand off your work by copying just the `.aprx` file to a shared drive. Your colleague opens it and every layer is broken. What went wrong, and what should you have shared instead?
- 24.** (Scenario) You need a thirty-page mapbook: one page per fire district, each page titled with that district's name and zoomed to that district at a sensible scale. What do you build, and what are its two or three key moving parts?
- 25.** (Scenario) A model you built runs perfectly on your machine, but when a colleague runs the shared toolbox it fails immediately with data-not-found errors. What do you check first?

Answer Key

- 1. B.** A project file stores maps, layouts, and connections as references to data, never the data itself. Sending the `.aprx` alone sends pointers to paths that exist only on the sender's machine. Compendium Chapter 21 (Pro Interface and Projects).
- 2. C.** Every project has a default geodatabase, and geoprocessing outputs land there unless you say otherwise. Knowing this is the difference between a tidy project and a mystery hunt for last week's results. Compendium Chapter 21 (Pro Interface and Projects).
- 3. C.** Environments cascade from application to model to tool, and the most local setting overrides the broader ones. This hierarchy is why a tool can ignore the project-level setting you swear you configured. Compendium Chapter 22 (Geoprocessing in Depth).
- 4. C.** Extent does not error and does not ask; features that intersect the extent are processed (in their entirety - the extent selects, it does not clip), and everything else is

silently excluded. A stale extent - say, one set from a zoomed-in display months ago - produces plausible-looking but incomplete outputs. Compendium Chapter 22 (Geoprocessing in Depth).

5. B. The Output Coordinate System environment projects data on the fly for processing and writes outputs in the specified system; inputs are untouched. The result is correct but can surprise you when the output's coordinate system differs from every input. See Compendium Chapter 3 (Coordinate Systems and Projections) for why this matters analytically, and Chapter 22 (Geoprocessing in Depth) for the environment mechanics.

6. B. Snap Raster aligns output cell origins to a reference raster so cells from separate analyses coincide exactly. Without it, two rasters with identical cell sizes can be offset by a fraction of a cell, which quietly corrupts cell-by-cell math. Compendium Chapter 22 (Geoprocessing in Depth).

7. B. The tool resamples to the environment's cell size and reports success. Detail is discarded with no warning, which is exactly why cell size deserves a deliberate decision rather than an inherited setting. Compendium Chapter 22 (Geoprocessing in Depth); Chapter 19 (Terrain and Raster Analysis) covers when resolution choices matter analytically.

8. B. Unclassed color maps the value range onto a continuous ramp, avoiding the judgment call of class breaks entirely. It suits continuous phenomena where breaks would be arbitrary; graduated colors suit communication of defined thresholds. Compendium Chapter 23 (Symbology and Labeling); Chapter 7 (Styling and Smart Mapping) covers the web-side equivalents.

9. B. Symbol layer drawing changes draw order from feature-by-feature to symbol-layer-by-symbol-layer, so every casing draws before any fill and connected roads merge visually. Compendium Chapter 23 (Symbology and Labeling).

10. B. Maplex is the advanced placement engine - and the default in Pro: it can stack, offset, curve, reduce, and strategically resolve label conflicts in ways the Standard engine cannot, trading some drawing speed for quality. Compendium Chapter 23 (Symbology and Labeling).

11. B. A layer file is properties plus a data-source pointer. It is the right vehicle for reusing carefully built symbology across projects, and the wrong vehicle for sharing

data. Compendium Chapter 23 (Symbology and Labeling).

12. B. A map frame is a window in the layout onto a map. Multiple frames can reference the same map (an overview inset plus a detail view) or different maps entirely, each with an independent extent. Compendium Chapter 24 (Layouts and Map Series).

13. C. A spatial map series is driven by an index layer; each feature becomes a page, with the extent derived from that feature. Bookmarks drive a different series type (a bookmark map series), not a spatial one; automatic grids and typed scale lists drive nothing - though a grid index layer you create yourself makes a fine index layer. Compendium Chapter 24 (Layouts and Map Series).

14. B. Inside the ModelBuilder view, intermediate data persists so you can inspect each step while building. Run as a tool, the model cleans up intermediate data automatically, behaving like a black box. Compendium Chapter 25 (ModelBuilder).

15. B. The P badge makes the variable a model parameter, which appears in the tool dialog when the model runs as a tool. Parameters are what turn a hardwired workflow into a reusable tool. Compendium Chapter 25 (ModelBuilder).

16. Any two of these (or similar) earn full credit: **Extent** silently excludes features that do not intersect it from processing; **Output Coordinate System** silently writes outputs in a different coordinate system than the inputs; **Cell Size** silently resamples rasters, discarding detail; **Mask** silently converts cells outside the mask to NoData; **Snap Raster** silently shifts output cell alignment. The common thread: each succeeds without complaint while producing something other than what a naive reading of the tool dialog predicts. Compendium Chapter 22 (Geoprocessing in Depth).

17. Nothing happens to the data. A layer is a reference to a dataset plus display properties; removing the layer removes the reference only. The dataset stays in its geodatabase or folder until you delete it there - typically from the Catalog pane. Compendium Chapter 21 (Pro Interface and Projects).

18. A label class is a subset of a layer's features labeled with its own expression, symbol, placement rules, and scale range. You create more than one to treat subsets differently: highways labeled with shields and street names in plain text, or major features labeled at small scales while minor ones appear only when zoomed in. Compendium Chapter 23 (Symbology and Labeling).

19. Dynamic text is a layout text element whose content updates automatically from properties: the current date, the map frame's scale, the project name, or - critically - attributes of the current map series page. Its signature use is mapbook titles: one text element that reads the index feature's name field produces a correct title on all thirty pages. Compendium Chapter 24 (Layouts and Map Series).

20. Percent signs perform inline variable substitution: the variable's current value is inserted into the string or path at run time. The signature use is inside an iterator, where `%Name%` (or similar) in an output path gives every iteration a unique output name instead of overwriting one file repeatedly. Compendium Chapter 25 (ModelBuilder).

21. Inside the ModelBuilder view, the model runs with the values currently wired into it, keeps intermediate data for inspection, and lets you run individual tools step by step - it is a workbench. From the tool dialog, the model prompts for its parameters, runs end to end, and cleans up intermediate data - it is a product. Test in the first mode; validate the real user experience in the second. Compendium Chapter 25 (ModelBuilder).

22. Check the geoprocessing environments, starting with Extent (and Mask if rasters are involved). An extent set earlier - often "current display extent" captured while you were zoomed in - silently drops features outside it, and Clip will report success anyway. The tool's entry in the geoprocessing history records the environment settings the run actually used, which is the fastest way to confirm the diagnosis. Compendium Chapter 22 (Geoprocessing in Depth); Chapter 39 (Troubleshooting Encyclopedia) catalogs this failure family.

23. The `.aprx` carries references, not data, so every path pointing at your local drives is broken on the colleague's machine. Share a project package instead, which consolidates the project together with its data into a single portable file - or keep project and data together in one folder structure and share the whole folder. For a quick one-off repair, the colleague can re-point each broken layer to a reachable copy of the data via the layer's source settings. Compendium Chapter 21 (Pro Interface and Projects).

24. Build a spatial map series on the layout. The moving parts: an index layer of fire districts (one page per district feature), the series' extent settings so each page zooms

to its district with appropriate margins or a rounded scale, and a dynamic text element bound to the district name attribute so the title updates per page. Export the series as a single multi-page PDF. Compendium Chapter 24 (Layouts and Map Series).

25. Check for hardcoded paths. Models built interactively tend to embed absolute paths to your local drives for inputs, outputs, and intermediate data - all invisible to you and all dead ends on another machine. The fix is structural: expose inputs and outputs as model parameters, write intermediate data to the scratch workspace via environments, and keep the toolbox and any bundled data in a shared, consistent folder structure. Compendium Chapter 25 (ModelBuilder); Chapter 31 (Python for ArcGIS) covers the same portability discipline for scripts.

Quiz: Volume F - Apps and Field Operations

This quiz covers Compendium Chapters 26-30: Instant Apps, StoryMaps, Dashboards, Experience Builder, and the field apps (Field Maps, Survey123, QuickCapture). It tests judgment - which builder fits which audience, how the pieces connect, and what breaks in the field - not menu trivia. Work through all 25 questions before checking the answer key. If a question exposes a gap, the chapter reference tells you where the full treatment lives.

Questions

1. A city council member asks for "something the public can read on their phone that explains the new flood zones, with maps woven into the text." Which builder fits best?
 - A. ArcGIS Dashboards
 - B. ArcGIS StoryMaps
 - C. ArcGIS Experience Builder
 - D. An Instant App with the Sidebar template
2. What is the core design philosophy of Instant Apps?

- A. Write JavaScript widgets against the Maps SDK
- B. Configure a purpose-built template around one primary task, rather than building an interface from scratch
- C. Assemble freeform pages from a widget library
- D. Generate apps automatically from a layer's schema

3. Where do most Dashboard elements (indicators, charts, lists) get their data?

- A. Only from CSV files uploaded to the dashboard
- B. From layers in the dashboard's web map, or from layers added directly as data sources
- C. From a database connection you configure inside the dashboard
- D. From the dashboard's built-in spreadsheet

4. You want a dropdown in a dashboard that lets viewers pick a district and have every chart, list, and the map update to show only that district. What mechanism does this?

- A. A definition query hardcoded on each element
- B. A category selector wired to filter actions on the other elements
- C. An Arcade expression in each element's title
- D. Separate dashboards per district, linked by URL

5. Which requirement most clearly justifies choosing Experience Builder over an Instant App?

- A. The app needs a legend
- B. The app must be mobile-friendly
- C. The app needs multiple pages with custom layouts mixing maps, surveys, text, and lists, with control over exactly where each piece sits
- D. The app needs to filter a layer

6. A utility crew inspects hydrants: they navigate to each asset on a map, then fill in condition attributes. Which field app is the natural fit?

- A. QuickCapture

- B. Survey123
- C. Field Maps
- D. ArcGIS StoryMaps

7. QuickCapture exists primarily for which situation?

- A. Long, complex forms with skip logic
- B. Rapid one-tap observations - recording things at speed with minimal attribute entry, such as noting damage from a moving vehicle
- C. High-accuracy GNSS surveying
- D. Offline map markup and redlining

8. Before a web map can be taken offline in Field Maps, what must be true?

- A. Nothing - all web maps work offline automatically
- B. The map must contain only raster layers
- C. The map's layers must be sync-enabled and the map enabled for offline use, with an exportable or sideloaded basemap
- D. The map must be shared with Everyone

9. By default, when two offline field workers edit the same feature and both sync, what happens?

- A. Both edits are rejected and flagged for review
- B. The sync process merges the attribute changes field by field
- C. One edit wins - by default the most recently synced change overwrites the other
- D. The feature is duplicated so both versions survive

10. Which audience/purpose pairing is the strongest match for ArcGIS Dashboards?

- A. The general public reading a narrative once
- B. Operations staff monitoring live or frequently updated data at a glance
- C. Editors digitizing new features
- D. Executives reading a printed report

11. In StoryMaps, what is an express map?

- A. A hosted feature layer published from the story
- B. A lightweight sketch map drawn inside the story builder, useful for simple annotation without publishing layers
- C. A cached basemap tile package
- D. A web map opened in a new tab

12. You are configuring an Instant App and keep fighting the template - the layout almost works but you need one panel the template does not offer. What is the sound move?

- A. Edit the app's HTML in the browser
- B. Accept the limitation or move up to Experience Builder; do not contort the template past its purpose
- C. Stack two Instant Apps in an iframe
- D. File the requirement as impossible in ArcGIS Online

13. Survey123 "smart forms" refers to what capability?

- A. Forms that auto-publish results to social media
- B. Conditional visibility, calculations, and constraints that adapt the form as the user answers - built in the web designer or, for advanced logic, in Survey123 Connect
- C. Forms that train a model on responses
- D. Forms that only work online

14. A viewer clicks a feature in your Instant App and the pop-up is a wall of raw field names. Where should you fix this?

- A. In the Instant App's configuration panel
- B. In the underlying web map's pop-up configuration, which the app inherits
- C. In the layer's REST endpoint
- D. You cannot; Instant Apps do not support formatted pop-ups

15. You share a dashboard link with a partner organization and they hit a sign-in prompt or see empty elements. The dashboard item itself is shared publicly. What is the most likely cause?

- A. The dashboard needs to be republished
- B. Their browser blocks JavaScript
- C. The web map or one or more of its layers is not shared at the same level as the dashboard
- D. Dashboards cannot be shared outside an organization

16. (Short answer) Why does the Compendium insist you finish the web map - symbology, pop-ups, labels, filters - before you open any app builder?

17. (Short answer) Name the three core field apps and give each a one-sentence statement of its primary role.

18. (Short answer) What is an offline map area, and name one place where you can define one ahead of time so crews do not build their own downloads.

19. (Short answer) Sync in Field Maps is described as bidirectional. What does that mean in practice for a field worker who taps Sync?

20. (Short answer) Give two concrete signals that a project has outgrown Instant Apps and justifies the extra build time of Experience Builder.

21. (Short answer) The field app chapters describe the choice between Field Maps and Survey123 as "map-centric versus form-centric." Explain what that distinction means and give one example workflow for each side.

22. (Scenario) A field crew spent the day collecting inspections offline. Back at the office, none of their edits appear in the web map. The crew lead insists "the app saved everything." What do you check first?

23. (Scenario) A client wants two things: a polished public page telling the story of a river restoration with scrolling narrative and maps, and an internal live view where staff track this week's water-quality readings as they come in. They ask you to "build one app that does both." How do you respond?

- 24. (Scenario)** A dashboard indicator that showed a count yesterday now reads no data or an error, and nobody edited the dashboard. What do you investigate first?
- 25. (Scenario)** Next month, crews will collect data in a remote area with no cell coverage. What do you do this week - before anyone drives out - to make sure collection will work?

Answer Key

- 1. B - ArcGIS StoryMaps.** A read-once narrative for the public, with maps embedded in flowing text, is exactly the StoryMaps use case; Dashboards are for monitoring and Experience Builder is overkill for a linear story. See Compendium Chapter 27 (StoryMaps).
- 2. B.** Instant Apps are configuration, not construction: you pick the template whose purpose matches the app's one primary task and fill in settings. Fighting that model is the main failure pattern. See Compendium Chapter 26 (Instant Apps).
- 3. B.** Dashboard elements bind to layers - usually those in the dashboard's web map, or layers added directly as data sources - and summarize their features. There is no internal spreadsheet or database connector. See Compendium Chapter 28 (Dashboards).
- 4. B.** Selectors (category, date, number) fire actions - filter, flash, pan, zoom - on target elements. Wiring a category selector's filter action to the other elements is the standard pattern for a district picker. See Compendium Chapter 28 (Dashboards).
- 5. C.** Multi-page apps, freeform layouts, and mixed content types are the signature Experience Builder justifications. Legends, mobile layouts, and filtering are all available in far simpler builders. See Compendium Chapter 29 (Experience Builder).
- 6. C - Field Maps.** The workflow is anchored to existing assets on a map: navigate to the feature, then edit its attributes. That map-first pattern is Field Maps' territory. StoryMaps is a narrative builder, not a field collection app. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture).
- 7. B.** QuickCapture trades attribute richness for speed: big buttons, one tap per observation, location captured automatically - built for windshield surveys and rapid

damage reports. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture).

8. C. Offline requires deliberate setup: sync-enabled layers, the map enabled for offline use, and a basemap that can either be exported or sideloaded to the device. None of it happens automatically. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture), with layer settings background in Compendium Chapter 10 (Hosted Feature Layers).

9. C. Default conflict resolution is last-in wins: the later sync overwrites the earlier edit on that feature. This is why territory assignment and sync discipline matter for teams editing shared features. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture) and editing conflict background in Compendium Chapter 13 (Editing Workflows).

10. B. Dashboards exist for at-a-glance monitoring of changing data by an operations audience. Narrative belongs to StoryMaps; editing belongs to the field apps and Map Viewer. See Compendium Chapter 28 (Dashboards).

11. B. Express maps are quick sketch maps drawn inside the story builder - annotation and simple geography without publishing hosted layers. They are not a substitute for real data layers when the map must stay current. See Compendium Chapter 27 (StoryMaps).

12. B. Templates are opinionated on purpose. When requirements genuinely exceed a template's options, step up to Experience Builder rather than hacking around the template - that is the intended escalation path. See Compendium Chapter 26 (Instant Apps) and Compendium Chapter 29 (Experience Builder).

13. B. Smart forms adapt as the respondent answers: questions appear or hide conditionally, values calculate automatically, and constraints reject bad input. Simple logic lives in the web designer; the deepest logic comes from Survey123 Connect. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture).

14. B. Apps inherit pop-ups, symbology, and labels from the web map. Fix the pop-up in the map, and every app built on that map improves at once. See Compendium Chapter 9 (Pop-ups, Fields, and Labels) for the configuration itself; the inheritance principle runs through all of Volume F.

- 15. C. Sharing is a chain:** app, web map, and every layer must all be visible to the intended audience. A public app over a private layer produces sign-in prompts or empty elements. See Compendium Chapter 28 (Dashboards) and the sharing treatment in Compendium Chapter 10 (Hosted Feature Layers).
- 16.** Because the builders inherit the web map's configuration - symbology, pop-ups, labels, filters, bookmarks - rather than replacing it. Time spent polishing the map pays off in every app built on it, and problems fixed in the map are fixed everywhere at once. See Compendium Chapter 6 (Map Viewer Complete Reference) and the opening of each Volume F chapter.
- 17. Field Maps:** map-centric collection, inspection, and markup against existing assets, with offline support. Survey123: form-centric structured data capture where the questionnaire, not the map, drives the workflow. QuickCapture: rapid one-tap observations at speed with minimal attribute entry. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture).
- 18.** An offline map area is a pre-packaged extent of the web map - features plus basemap - that a device downloads as a unit for disconnected work. You can define areas ahead of time in the web map's item page offline settings or in the Field Maps Designer web app, so crews download a ready-made package instead of improvising their own. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture).
- 19.** Sync pushes the worker's local edits up to the hosted layer and pulls down edits others have made since the last sync. It is a two-way exchange, not just an upload - after syncing, the device reflects the current shared state of the data. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture).
- 20.** Any two of: the app needs multiple pages or views; the layout must mix content types (map plus embedded survey plus lists plus text) in a custom arrangement; you need widgets or interactions no Instant App template offers; you need fine control over placement, or differing designs per screen size, beyond what template settings allow. See Compendium Chapter 29 (Experience Builder).
- 21.** Map-centric means the worker's mental model starts with a location or asset - find it on the map, then enter data about it (hydrant inspections, asset condition checks: Field Maps). Form-centric means the questionnaire is the workflow and location is just

one answer among many (public health intake surveys, permit applications: Survey123). See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture).

22. Check whether the device actually synced. Offline edits live only on the device until a sync runs, so "the app saved everything" can be true locally while nothing has reached the layer. Open the app's sync status or pending-edits indicator on the device; if edits are queued, sync over a reliable connection before investigating anything else (layer settings, credentials, connectivity come next). See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture) and Compendium Chapter 39 (Troubleshooting Encyclopedia).

23. Split it: these are two audiences with two jobs, and the builders are purpose-built for each. Build the public narrative in StoryMaps and the internal monitoring view in Dashboards, both on the same underlying layers, and link between them if needed. One app serving both audiences would compromise each - a story does not monitor, and a dashboard does not narrate. See Compendium Chapter 27 (StoryMaps) and Compendium Chapter 28 (Dashboards).

24. Investigate the data source, not the dashboard: check that the layer still exists, is still shared to the dashboard's audience, and still returns features - a deleted or re-shared layer, an expired filter window (for example, a date filter that no longer matches any data), or a schema change to the summarized field are the usual culprits. Open the web map first; if the layer is broken there, the dashboard is just reporting it. See Compendium Chapter 28 (Dashboards) and Compendium Chapter 39 (Troubleshooting Encyclopedia).

25. Do the whole offline setup and a full dry run now: confirm every layer is sync-enabled and the map enabled for offline use, choose an offline-capable basemap (exportable or sideloaded), define offline map areas covering the work zone, then download to an actual field device, put it in airplane mode, collect test features, and sync when reconnected. Any failure you find this week is a fix; the same failure next month is a lost field day. See Compendium Chapter 30 (Field Maps, Survey123, QuickCapture).

Quiz: Volume G - Automation and Administration

This quiz covers Compendium Chapters 31 through 35: Python for ArcGIS, REST services, the Maps SDK for JavaScript, administration, and ArcGIS Enterprise. It tests judgment — which tool for which job, what to check first, when code is worth writing — not memorized menu paths. Work through all 25 questions before checking the answer key. Each answer cites the chapter where the topic is treated in depth.

Questions

1. You need to write a script that reassigns ownership of 300 items from a departing employee to their replacement in your ArcGIS Online organization. Which Python library is the right tool?

- A. ArcPy, because it is Esri's primary Python library
- B. The ArcGIS API for Python, because it is built for administering a web GIS
- C. Either one — they are interchangeable
- D. Neither — item ownership can only be changed one item at a time in the browser

2. What does ArcPy require in order to run?

- A. Nothing — it installs from any package manager on any machine
- B. An ArcGIS Online account with administrative privileges
- C. A licensed ArcGIS Pro (or Enterprise) installation, whose Python environment it ships with
- D. A web browser with a signed-in session

3. You have 200 shapefiles on a network drive that all need the same repair: reproject, fix a field name, and export to a geodatabase. Which approach fits best?

- A. An ArcPy script run from the Python window or an IDE on a machine with Pro
- B. The ArcGIS API for Python, because it handles content at scale
- C. A hosted notebook in ArcGIS Online
- D. The Maps SDK for JavaScript

4. You paste a hosted feature layer's service URL into a browser and add `?f=pjson` to the end. What do you get back?

- A. An error — service URLs only respond to applications, not browsers
- B. A human-readable JSON description of the service: its layers, properties, and capabilities
- C. A download of the layer's data as a file
- D. The layer's item page in ArcGIS Online

5. In a feature service URL that ends in `/FeatureServer/0`, what does the `0` refer to?

- A. The number of features currently in the service
- B. The version of the REST API
- C. The index of a specific layer within the service
- D. A flag meaning the service is unsecured

6. Which REST endpoint would an application hit to ask a layer "give me all features where STATUS = 'Open'"?

- A. The service root
- B. The layer's `/query` endpoint, with a `where` parameter
- C. The `/export` endpoint
- D. The organization's home page

7. In the context of secured ArcGIS services, what is a token?

- A. A permanent password embedded in the service URL
- B. A short-lived credential that proves an identity to the server so it can enforce sharing rules
- C. A credit voucher for premium services
- D. A unique ID assigned to each feature

8. Which of these situations most clearly justifies writing a script instead of doing the work by hand?

- A. A one-time export of a single layer to a shapefile
- B. Renaming one field in one layer
- C. A task you perform identically every week, involving dozens of items, where a mistake is easy to make by hand
- D. Exploring an unfamiliar dataset for the first time

9. Your team wants an app with a very specific interaction — a custom split-screen comparison with synced timelines and bespoke charts — that no configurable app template supports. What is the honest cost of choosing the Maps SDK for JavaScript?

- A. None; the SDK is just a faster way to configure the same apps
- B. You take on writing, hosting, securing, and maintaining code indefinitely, in exchange for full control
- C. The SDK cannot use your hosted layers, so you must re-publish everything
- D. SDK apps cannot be shared publicly

10. In the default ArcGIS Online roles, what is the key capability a Publisher has that a User does not?

- A. Viewing content shared with their groups
- B. Joining groups
- C. Publishing hosted layers and running analysis that creates new content
- D. Changing organization security settings

11. Which of these actions typically consumes credits in ArcGIS Online?

- A. Viewing a web map someone shared with you
- B. Storing hosted feature layer data and running certain analysis or geocoding operations
- C. Signing in to the organization
- D. Symbolizing a layer with smart mapping

12. What is the purpose of a group with "shared update" (update capability) enabled?

- A. It lets members delete the group

- B. It lets all members edit the items shared to the group, not just the item owners
- C. It automatically shares every new item in the organization to the group
- D. It grants members administrator privileges

13. Why do organizations create custom roles instead of using only the default ones?

- A. Custom roles are required before anyone can sign in
- B. Default roles expire after a period of time
- C. To apply least privilege — granting exactly the capabilities a job needs and nothing more
- D. Custom roles are the only way to give someone editing rights

14. Which situation is the strongest signal that an organization needs ArcGIS Enterprise rather than ArcGIS Online?

- A. They want to make web maps quickly with no IT involvement
- B. Policy or regulation says their data cannot leave their own network or country
- C. They want access to the Living Atlas
- D. They have fewer than ten users

15. What does ArcGIS Enterprise let you do with data in your own enterprise databases that ArcGIS Online cannot?

- A. Nothing — ArcGIS Online can read any database directly
- B. Publish services that reference the data in place, so the database remains the live source of truth
- C. Convert the database to shapefiles automatically
- D. Give the database a public URL without any server

16. Short answer: Name the two Python libraries covered in Compendium Chapter 31 and state, in one sentence each, what each one is for.

17. Short answer: A colleague says "REST services are only for developers — I don't write code, so the REST endpoint is irrelevant to me." Give two practical reasons a non-developer should still be able to read a service's REST page.

- 18.** Short answer: What can a hosted notebook in ArcGIS Online do that a Python script sitting on your desktop machine cannot?
- 19.** Short answer: List two questions you should answer before committing to a custom Maps SDK for JavaScript app instead of a configurable app (Instant Apps, Dashboards, Experience Builder).
- 20.** Short answer: Name two operations that consume credits and one common operation that does not, and explain why an administrator should know the difference.
- 21.** Short answer: Give two decision factors, other than "data cannot leave our network," that push an organization toward ArcGIS Enterprise or toward keeping everything in ArcGIS Online.
- 22.** Scenario: Every Monday morning you download a CSV from a corporate system, delete some columns, fix a date format, and overwrite a hosted feature layer with it. It takes 45 minutes and you have twice uploaded the wrong file. You want to automate it. What do you reach for, and what should you confirm before writing any code?
- 23.** Scenario: A public web map that worked yesterday now shows blank where one layer should be, and a browser test of that layer's REST URL prompts for a sign-in. Other layers in the map draw fine. What is the most likely cause, and what do you check first?
- 24.** Scenario: Your organization's credit balance is dropping much faster than usual and nobody knows why. As an administrator, what do you do first — before restricting anyone's privileges?
- 25.** Scenario: A new field technician needs to open maps in the field and edit features in two specific layers. They should not be able to publish layers, run analysis, or delete anyone's content. Describe how you would set up their account and access.

Answer Key

- 1. B.** The ArcGIS API for Python is designed for administering a web GIS — users, groups, items, and sharing — and includes admin operations like reassigning ownership. ArcPy is for geoprocessing and desktop data work, not portal administration. (Compendium Chapter 31, Python for ArcGIS)

- 2. C.** ArcPy ships inside the Python environment of a licensed ArcGIS Pro or Enterprise installation; it is not a standalone package you can install anywhere. The ArcGIS API for Python, by contrast, installs into any standard Python environment. (Compendium Chapter 31, Python for ArcGIS)
- 3. A.** This is local data manipulation and geoprocessing — ArcPy territory. The ArcGIS API for Python manages web GIS content, and a hosted notebook cannot see your network drive. (Compendium Chapter 31, Python for ArcGIS)
- 4. B.** Every ArcGIS REST endpoint is self-describing, and `f=json` asks for formatted JSON you can read in a browser. The service root describes the whole service — its layers and capabilities — while each layer's own page adds detail such as fields and properties like the maximum record count. Reading these pages is basic service literacy even if you never write code. (Compendium Chapter 32, REST Services)
- 5. C.** A feature service can contain multiple layers and tables; the trailing number is the index of one of them. The service root URL describes the whole service, while `/0` , `/1` , and so on address individual layers. (Compendium Chapter 32, REST Services)
- 6. B.** The `/query` endpoint on a layer accepts a `where` clause (plus geometry, output field, and format parameters) and returns matching features. It is the workhorse endpoint behind almost every web map request. (Compendium Chapter 32, REST Services)
- 7. B.** A token is a short-lived proof of identity that accompanies requests so the server can apply sharing and privilege rules. It is not permanent and should never be treated like a password to embed in public pages. (Compendium Chapter 32, REST Services)
- 8. C.** Code pays off with repetition, scale, and error-proneness: the same steps, many items, high cost of a manual slip. One-off tasks and exploratory work are usually faster by hand — writing a script for them costs more than it saves. (Compendium Chapter 31, Python for ArcGIS)
- 9. B.** The SDK gives full control at the price of a real software project: development, hosting, authentication handling, upgrades, and maintenance for the life of the app. If a configurable app gets you most of the way there, it is almost always the cheaper honest answer. (Compendium Chapter 33, Maps SDK for JavaScript Primer)

10. C. Publishers can create hosted layers and run analysis tools that generate new content; Users consume and create maps from existing content but do not publish services. This distinction is the main lever for controlling who can create content that stores data and consumes credits. (Compendium Chapter 34, Administration)

11. B. Credits are consumed by things that cost Esri compute or storage — hosted feature data storage, batch geocoding, certain analysis tools, and similar premium operations. Viewing maps, signing in, and styling layers do not consume credits. (Compendium Chapter 34, Administration)

12. B. A shared update group lets every member edit items shared to it — the standard pattern for teams that co-author maps and apps, so work does not stall when the item owner is unavailable. Normally only an item's owner (or an admin) can modify it. (Compendium Chapter 34, Administration)

13. C. Custom roles implement least privilege: you start from a default role and remove or add specific capabilities so each person has exactly what their job requires. This limits both accidents and damage from compromised accounts. (Compendium Chapter 34, Administration)

14. B. Data sovereignty and network isolation requirements are the classic hard drivers for Enterprise, because ArcGIS Online stores data in Esri's cloud. The other options all point toward, or are equally served by, ArcGIS Online. (Compendium Chapter 35, ArcGIS Enterprise)

15. B. Enterprise can publish services that reference registered enterprise databases in place, so the database remains the live system of record and edits flow through it. ArcGIS Online hosts copies of data in Esri's cloud instead. (Compendium Chapter 35, ArcGIS Enterprise)

16. ArcPy: the geoprocessing library inside ArcGIS Pro's Python environment, for automating desktop data work — analysis tools, data management, map and layout automation. ArcGIS API for Python: a standalone library for working with a web GIS — searching, publishing, and managing items, users, and groups in ArcGIS Online or Enterprise. Rule of thumb: ArcPy touches data and maps on a machine with Pro; the ArcGIS API for Python touches the portal. (Compendium Chapter 31, Python for ArcGIS)

17. Any two of: (1) troubleshooting — the REST page tells you whether a service is actually up, what layers it contains, and whether a field really exists, independent of any app on top of it; (2) capacity awareness — properties like the maximum record count explain why a single request returns only part of a large dataset, which shows up as apps displaying incomplete results; (3) capability checks — you can see whether a layer supports editing, sync, or queries before you build a workflow that assumes it does. The REST page is the ground truth beneath every map and app. (Compendium Chapter 32, REST Services)

18. A hosted notebook runs in ArcGIS Online's cloud, so it can be scheduled to run on its own — no desktop machine that must be on, signed in, and awake. That makes it the natural home for recurring portal tasks like nightly data refreshes or weekly cleanup reports. Its trade-offs: it cannot reach files on your local network, and running notebooks — scheduled runs included — consumes credits. (Compendium Chapter 31, Python for ArcGIS)

19. Any two of: Can a configurable app (Instant Apps, Dashboards, Experience Builder — Compendium Chapters 26, 28, 29) deliver the requirement, even at 90 percent? Who will maintain, host, and secure the code after launch? Do we have (or can we fund) actual JavaScript development capacity, not just enthusiasm? Is the custom requirement real, or a preference that would not survive a cost conversation? The point of the questions is that custom code is a standing liability, not a one-time purchase. (Compendium Chapter 33, Maps SDK for JavaScript Primer)

20. Consume credits: storing hosted feature layer data, batch geocoding, and premium analysis operations (any two of these). Does not: viewing or sharing maps, styling layers, ordinary sign-ins. An administrator needs the distinction to budget, to decide who gets publishing and analysis privileges, and to diagnose unexpected credit drains instead of guessing. Exact credit rates vary by operation, so check current Esri documentation rather than relying on remembered numbers. (Compendium Chapter 34, Administration)

21. Any two of: need to publish services referencing internal enterprise databases in place; integration with internal systems behind the firewall; requirement to control upgrade timing and versions yourself; specialized server capabilities not available as hosted services. Pointing the other way, toward ArcGIS Online: no server

administration burden, Esri handles scaling and upgrades, and lower IT staffing requirements. Enterprise is a commitment to running infrastructure; the deciding question is whether the control is worth the operational cost. (Compendium Chapter 35, ArcGIS Enterprise)

22. This is the textbook automation case: weekly, repetitive, error-prone. The tool is Python — the ArcGIS API for Python to overwrite or update the hosted layer, ideally in a hosted notebook so it can run on a schedule without your machine. Before writing code, confirm two things: whether the corporate system can be reached programmatically (an export URL or API beats a manual download), and whether the layer's item page already offers a suitable scheduled update or overwrite path that meets the need without a script. Automate the whole chain or you have only moved the manual step. (Compendium Chapters 31 and 32; scheduled-update options in Chapter 10, Hosted Feature Layers)

23. A sign-in prompt at the REST endpoint means the layer is no longer shared publicly — the map is public but the layer's sharing level changed, which is why only that layer fails. Check the layer's sharing settings on its item page first, before touching the map or the app. A layer must be shared at least as broadly as the map that contains it; this mismatch is one of the most common failures in shared web maps. (Compendium Chapter 32, REST Services; sharing troubleshooting in Chapter 39, Troubleshooting Encyclopedia)

24. Diagnose before restricting: open the organization's administrative status and credit usage reports and identify which operations and which members are consuming credits, and since when. Usual suspects are a large batch geocoding job, an analysis tool run repeatedly, or hosted storage growth from newly published layers. Once you know the source, the fix is targeted — a conversation, a credit budget for that member, or cleanup of oversized hosted layers — rather than a blanket privilege lockdown that punishes everyone. (Compendium Chapter 34, Administration)

25. Give them an account with a user type that supports editing, assigned a role with edit privileges but without publishing or analysis capabilities — a default limited role or a custom role trimmed to exactly editing. Then add them to the group through which the two editable layers are shared, so their access comes from group membership rather than broad organization-wide sharing. Verify the layers themselves have editing

enabled with appropriate limits (see Compendium Chapter 13, Editing Workflows). The result is least privilege: they can do their job and nothing else. (Compendium Chapter 34, Administration; field workflows in Chapter 30, Field Maps, Survey123, QuickCapture)

Quiz: Volume H — Practice and Reference

This quiz covers Compendium Chapters 36 through 40: the two worked projects, the cookbook, the troubleshooting encyclopedia, and the glossary. It tests judgment — why a decision was made, what to check first, which rule applies — not menu memorization. Questions 1–15 are multiple choice, 16–21 are short answer, and 22–25 are scenarios where you describe your first move.

Questions

1. The Milbrook tree inventory project sketches the pipeline in reverse — dashboard, web map, view, master layer, schema, cleaned data — before touching anything. Why?

- A) Dashboards must be approved by stakeholders before any data work begins
- B) Each layer of the stack constrains the one below it, so the finished product dictates requirements all the way down to the raw data
- C) ArcGIS Online requires the app to exist before layers can be shared into it
- D) Working backward reduces the credit cost of publishing

2. The Milbrook schema stores `tree_id` as a text field rather than a number. What is the reasoning?

- A) Text fields index faster than numeric fields in hosted layers
- B) Numeric fields cannot serve as unique keys in ArcGIS
- C) IDs like `T-00042` carry leading zeros and letters, and you will never do math on an ID
- D) Domains can only be attached to text fields

3. Months after launch, the city asks for a public tree map that must hide the `crew` and `notes` fields and exclude dead trees. Because the project used the master-and-views pattern, what does this request actually require?

- A) Exporting the master layer to a new CSV, cleaning it, and republishing a public copy
- B) Creating one new view with hidden fields and a filter, and sharing that view publicly — the master and every existing app stay untouched
- C) Enabling anonymous access on the master layer and relying on pop-up configuration to hide the sensitive fields
- D) Rebuilding the web map and dashboard against a duplicated layer

4. The director always wants to know how long since each tree was inspected. Why does Chapter 36 compute this with an Arcade pop-up expression instead of storing it in a field?

- A) Date fields cannot be subtracted from each other in ArcGIS
- B) A stored value goes stale the moment it is written; the expression calculates fresh at click time
- C) Arcade expressions render faster than stored fields in pop-ups
- D) Dashboards cannot chart values that live in stored fields

5. Chapter 36 describes a "safe schema-change vocabulary." Which is it, and why?

- A) *Rename* freely — aliases update automatically everywhere
- B) *Delete and recreate* — it keeps the field list clean
- C) *Add*, never rename or delete — pop-ups, filters, dashboard elements, and Arcade all reference fields by name and break quietly when a name disappears
- D) *Rebuild* — republish the layer for any schema change so the item ID stays fresh

6. The playground inspection project rejects the "naive design" of one point per inspection in favor of an equipment layer plus a related inspections table. What is the core failure of the naive design?

- A) Point layers have a hard limit on how many features they can hold

- B) Repeated inspections of the same asset become scattered near-duplicate points with inconsistent typing, and there is no way to ask for one asset's history
- C) A single layer cannot store photos as attachments
- D) Offline map areas cannot include layers with frequent edits

7. Chapter 37 offers a one-question test for whether a piece of information belongs on the asset or on the inspection. What is the question?

- A) Is the value required by the form?
- B) Does the value need a domain?
- C) Is the value numeric?
- D) Does the answer change between visits?

8. The inspection form makes the comments field appear — and become required — only when a condition is Poor or Unsafe or a check failed. What principle is this pattern applying?

- A) Short form on the happy path, demanding form on the failure path: respect the inspector's time where things are fine, concentrate rigor exactly where it pays
- B) Keeping the sync payload small by minimizing text entry
- C) Preventing sync conflicts by reducing the number of editable fields
- D) Field Maps requires conditional visibility on all free-text fields

9. An inspector's sync fails with a network error halfway through an upload. Per the rule drilled into the field crew, what is true and what should they do?

- A) The uploaded half is saved and the rest is lost; re-enter the missing records
- B) A failed sync loses nothing — the edits are still on the device; find better signal and retry, and never delete or reinstall the app
- C) The offline area is now corrupt; delete it and re-download before continuing
- D) The server holds a partial transaction that an administrator must roll back first

10. Chapter 38 opens with a rule for guessing where any task lives. Which statement matches it?

- A) Anything involving data lives in ArcGIS Pro; anything involving display lives in the browser
- B) If it changes how a layer looks in one map, it belongs in Map Viewer; if it changes what a layer is everywhere — its data, schema, or sharing — it belongs on the item page
- C) Analysis lives in Map Viewer; configuration lives in the app builders
- D) Everything permanent requires an administrator; everything temporary can be done by any member

11. You have newer data for a published hosted layer that five web maps use. Why does the cookbook insist on overwriting in place rather than deleting the layer and adding a new one with the same name?

- A) Overwriting costs no credits while publishing a new layer does
- B) A deleted layer's name is permanently retired, so the replacement could never reuse it
- C) Delete protection blocks re-adding an item under a used name
- D) Overwriting preserves the item ID, so every map and app that references the layer keeps working; a new item gets a new ID and breaks them all

12. You are turning a 50,000-row CSV into points. What is the cost difference between locating by coordinates and locating by street address?

- A) Both are free; only analysis tools consume credits
- B) Coordinates cost credits; addresses are free because the geocoder is bundled
- C) Locating by latitude-longitude columns is free; geocoding street addresses consumes credits in proportion to row count
- D) Both consume credits equally, scaled by file size

13. Chapter 39's universal first move for any symptom that appears in an app is to "isolate the layer" of the stack. What does that mean in practice?

- A) Turn layers off one at a time in the app until the symptom disappears
- B) Open the data table first; if the data is right, open the web map in Map Viewer; if the map is right, the problem is in the app — work bottom-up

- C) Duplicate the app and test the copy so the original stays safe
- D) Check Esri's service health dashboard before touching anything

14. Your imported points appear mirrored into the wrong hemisphere. Which cause tops the ranked list?

- A) A datum mismatch between the layer and the basemap
- B) Blank coordinate values defaulting to zero
- C) Latitude and longitude columns swapped, or signs dropped, during import
- D) The basemap is drawn in a different projection than the data

15. A browser analysis tool runs without error but returns an empty or obviously incomplete result. What does Chapter 39 call the champion cause?

- A) The organization ran out of credits mid-run
- B) The extent setting — an option like "use current map extent" silently clipped the analysis to wherever you happened to be zoomed
- C) The input layer had the wrong geometry type
- D) The output layer was created but not shared to you

16. (*Short answer*) On collection day in Chapter 37, Maria and Dev unknowingly inspected the same structure fifteen minutes apart while both offline. Why was this collision boring rather than destructive, and which schema decision was responsible?

17. (*Short answer*) An app "works for you but not for anyone else." Why does the owner never see this problem, and what is the only verification method Chapter 39 says actually counts?

18. (*Short answer*) When joining a spreadsheet of statistics to county polygons, why does the cookbook say to join by a standardized code rather than by name whenever a code exists?

19. (*Short answer*) Distinguish `arcpy` from the ArcGIS API for Python — what does each one automate?

20. (*Short answer*) A colleague says a layer "has a definition query on it." What is happening to the data, and what is not happening to it?

- 21. (Short answer)** Your organization's credit balance drains steadily even on days when nobody runs analysis or geocoding. Which consumer does Chapter 39 call "the quiet one," and where do you confirm it?
- 22. (Scenario)** You built a tree dashboard exactly as in Chapter 36 and shared it to the parks group. A group member reports the dashboard opens but shows empty charts and a missing map layer; on your screen everything is perfect. What do you check first?
- 23. (Scenario)** Three weeks into the inspection season, the supervisor asks you to add a field to the inspections table. Both inspectors' phones hold offline map areas built on the current schema. What must happen, in order, before the field is added?
- 24. (Scenario)** A newly imported hydrant layer draws every point about one street from its true position — a small, identical offset everywhere. A coworker offers to spend the afternoon dragging each point onto the right corner. What do you do instead, and why?
- 25. (Scenario)** You are about to calculate a new size-class field across roughly 80,000 rows of a production hosted layer that live apps depend on. What do you do before pressing run?

Answer Key

- 1. B.** Every layer of the stack constrains the one below it: the dashboard dictates the map, the map dictates the view, and so on down to the cleaned CSV, and mistakes made at the bottom surface expensively at the top. Compendium Chapter 36 (Worked Project - Dashboard).
- 2. C.** IDs are labels, not quantities — `T-00042` needs its leading zeros preserved and will never be summed or averaged, so text is the correct type. Compendium Chapter 36 (Worked Project - Dashboard), with schema depth in Chapter 12 (Schema Design).
- 3. B.** A view is not a copy — it reads the master's data live but carries its own sharing, field visibility, and filters, so a new audience means a new view and nothing else changes. Compendium Chapter 36 (Worked Project - Dashboard); internals in Chapter 10 (Hosted Feature Layers).
- 4. B.** "Years since inspection" changes every day, so any stored copy is stale the moment it is written; an Arcade expression derives it fresh each time the pop-up opens

— "derived facts without stored staleness." Compendium Chapter 36 (Worked Project - Dashboard); the language in Chapter 8 (Arcade).

5. C. Every pop-up expression, dashboard element, filter, and Arcade snippet refers to fields by name, and a rename breaks each of them silently in whatever app you forgot to check. If a field is truly wrong, add its replacement, migrate values, and retire the old one from view configurations. Compendium Chapter 36 (Worked Project - Dashboard).

6. B. One point per inspection "rots immediately": three visits to one slide become three near-duplicate points with three spellings of its type, and no query can reconstruct the slide's history. Compendium Chapter 37 (Worked Project - Field Collection); relationships in Chapter 12 (Schema Design).

7. D. "Does the answer change between visits?" Manufacturer does not — asset field; condition does — inspection field; anything you want in both places belongs on the inspection, because the asset copy drifts out of date. Compendium Chapter 37 (Worked Project - Field Collection).

8. A. Short form on the happy path, demanding form on the failure path — the chapter calls it the single highest-leverage form design trick in field work: passing equipment costs five taps, while failures trigger a required explanation. Compendium Chapter 37 (Worked Project - Field Collection).

9. B. A failed sync loses nothing — the edits remain on the device, so the fix is better signal and a retry; the catastrophic move is reinstalling the app, which destroys every unsynced record. Compendium Chapter 37 (Worked Project - Field Collection); sync diagnosis in Chapter 39 (Troubleshooting Encyclopedia).

10. B. Map-level appearance lives in Map Viewer; layer identity (data, schema, sharing) lives on the item page — one distinction that resolves most "where is that setting" confusion. Compendium Chapter 38 (Cookbook).

11. D. Overwriting keeps the item ID, so nothing downstream notices the swap; deleting and re-adding creates a new item with a new ID, and every referencing map shows a broken layer. Compendium Chapter 38 (Cookbook), Recipe 5; overwrite versus append in Chapter 10 (Hosted Feature Layers).

12. C. Coordinate columns are placed for free; street addresses run through the geocoder, which consumes credits in proportion to row count — and either way, spot-check a sample of the placed points before trusting the batch. Compendium Chapter 38 (Cookbook), Recipe 21; credits in Chapter 34 (Administration).

13. B. The defect can live in the data, the layer item, the web map, or the app — four separate items — and the most common troubleshooting mistake is fixing the wrong one. Opening the data table first and working upward names the lowest broken layer. Compendium Chapter 39 (Troubleshooting Encyclopedia).

14. C. Mirrored or wrong-hemisphere data means the latitude and longitude columns were swapped or signs were dropped at import; blank coordinates produce Null Island stacking, and a datum mismatch produces a small consistent offset — different symptoms, different causes. Compendium Chapter 39 (Troubleshooting Encyclopedia); import screens in Chapter 11 (Creating Data).

15. B. "Use current map extent" silently clips the analysis to wherever you happened to be zoomed, with no warning — check the extent option before every run. Compendium Chapter 39 (Troubleshooting Encyclopedia).

16. Both inspectors *added* new inspection rows rather than editing the same existing record, and additions never conflict at sync time — the structure simply gained two same-day inspections that QA resolved by keeping the more complete one. The responsible decision is the schema: pushing nearly all field activity into new related rows leaves the equipment records almost untouched, so the last-in-wins conflict rule rarely fires. Compendium Chapter 37 (Worked Project - Field Collection).

17. The app, its map, and its layers are separate items with separate sharing, and the owner always has access to everything they own, so their own screen always looks fine. The only verification that counts is opening the app's link in a private browser window while signed out. Compendium Chapter 39 (Troubleshooting Encyclopedia); the same warning appears at the sharing step of Chapter 36 (Worked Project - Dashboard).

18. Names fail on punctuation, abbreviations, and spelling drift, and every failed match becomes a silent hole in the map rather than an error; a standardized code matches exactly or not at all. Compendium Chapter 38 (Cookbook), Recipe 29; joins in Chapter 16 (Proximity and Overlay).

19. `arcpy` is the Python package built into ArcGIS Pro that automates geoprocessing and desktop workflows on your machine; the ArcGIS API for Python is a separate library for working with your *web* GIS — users, content, and services in ArcGIS Online or Enterprise. Compendium Chapter 40 (Mega-Glossary and Resources); both in Chapter 31 (Python for ArcGIS).

20. A definition query hides every feature that fails a saved condition, so the layer displays a subset. The data itself is untouched — nothing is deleted, the attribute table still holds everything, and other maps using the layer are unaffected. Compendium Chapter 40 (Mega-Glossary and Resources).

21. Hosted feature layer storage — charges accrue continuously on stored data, so a huge forgotten layer costs credits every day "while everyone sleeps." Confirm in the administrator's credit dashboard, which breaks usage down by user and capability. Compendium Chapter 39 (Troubleshooting Encyclopedia); credit administration in Chapter 34 (Administration).

22. Check the sharing of the whole chain: the web map and the reporting view are separate items that must also be shared to the group, and this classic nested sharing failure looks fine to you because you own everything. Verify the fix as your audience — a private signed-out window or a group member's account, not your own. Compendium Chapter 36 (Worked Project - Dashboard) and Chapter 39 (Troubleshooting Encyclopedia).

23. Every field device syncs its pending edits and removes its offline areas *before* you touch the schema; then you make the change and the crews re-download fresh areas. Changing a schema while offline copies exist is the single most destructive routine mistake in field operations — stuck devices may no longer be able to reconcile, and the damage surfaces days later on someone else's phone. Compendium Chapter 39 (Troubleshooting Encyclopedia) and Chapter 37 (Worked Project - Field Collection).

24. Refuse the dragging: a small, identical offset everywhere is almost never a data-entry problem — it is a datum or transformation mismatch, so fix the import by declaring the correct coordinate system and re-importing. Hand-dragging features to look right against the basemap corrupts good data to match a wrong assumption. Compendium Chapter 39 (Troubleshooting Encyclopedia); datums in Chapter 3 (Coordinate Systems and Projections).

25. Export a backup first — a file geodatabase export from the item page — because field calculation rewrites every unfiltered row immediately, with no undo; then apply a filter if only some rows should change, and preview the expression on a feature before running. The cookbook calls the export "insurance against every destructive recipe in this chapter." Compendium Chapter 38 (Cookbook), Recipes 25 and 28.