Mastering ArcGIS 7th edition Price Solutions Manual

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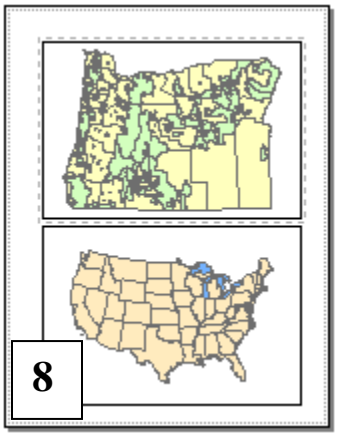
Chapter 1

Answers to Exercises 1

1. The feature data set is called Transportation. It has two feature classes, majroads and interstates.
   Method: Use the Add Data button to look at the usdata geodatabase.

2. The coordinate system of interstates/majroads is North America Equidistant Conic.
   Method: Open the layer properties in the Table of Contents and examine the Coordinate System tab.

3. There are 3141 counties in the United States, 58 of them are in California.
   Method: Open the attribute table for counties and do a query for STATE_NAME = 'California'

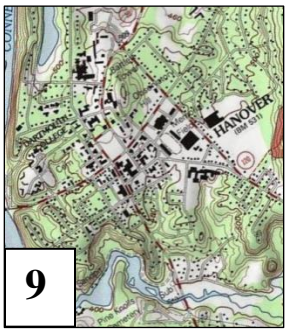


4. The largest lake is Lake Superior. It is 32,213 mi^2.
   Method: Open the attribute table for the lakes feature class and sort the Area field to find the largest lake.

5. Mississippi contains the county Itawamba.
   Method: Open the county attribute table and use Find to locate Itawamba in the table.

6. The average 2010 state population density is 338 people/sq mi. The minimum is 1 and the maximum is 8833.
   Method: Open the states attribute table, right-click the POP10_SQMI field and choose Statistics.

7. The other four feature class types are annotation, dimensions, multipoints, and multipatches.
   Method: Open Help and type "feature classes" in the Search tab. Find the feature class basics entry.



8. See map.
   Method: Create two data frames and arrange them on the page. Activate one, add the required data, and set the symbols. Repeat for the second.

9. Answers will vary; see map for example using Dartmouth College.
   Method: Search for 'topo' and add the USA Topo Maps service to the map. Zoom to the campus.

10. See map.
    Method: Add the feature classes to a new blank map. Open the Layers data frame properties and choose the Predefined > Projected > World > Robinson coordinate system.



Answer to Challenge Problem 1

Answers will vary.

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Chapter 2

Answers to Exercises 2

1. There are two feature datasets, Transportation and Water. There are 14 feature classes and 5 rasters.
   Method: Use the Catalog tab to examine the geodatabase.
2. It has 1609 rows and 1964 columns, and a cell size of 30 meters. It has 8 bands. The coordinate system is WGS_1984 UTM Zone 10N.
   Method: In the Catalog tab, right-click the raster in the Oregon folder and open its Properties. You will find all the necessary information here.
3. It was created by the USGS Eros Data Center in 1996 and uses meters for the elevations.
   Method: Examine the metadata in the Item Description window in the Catalog tab.
4. The map document is referencing data in the NewJersey geodatabase rather than in the mgisdata folder, so putting it in the New Jersey project folder will keep it together with the data if the project folder is moved.
5. Answers will vary.
6. **Method:** Right-click the appropriate location to create the folder and geodatabase. Given them appropriate names.
7. Exact expression will vary for each state, but for New Jersey the list would look like this:
   Interstates: clip
   Majroads: clip
   Cd110: STATE_ABBR = 'NJ'
   Cd111: STATE_ABBR = 'NJ'
   Cities: ST = 'NJ'
   Counties: STATE_NAME = 'New Jersey'
   Lakes: clip
   Quakehis: STATE = 'NJ'
   Rivers: clip
   Spcszn83: clip
   States: STATE_NAME = 'New Jersey' or STATE_ABBR = 'NJ'
   Volcanoes: clip
8. Answers 8-10 will vary.
   Method: Use ArcMap to query and export to the home state geodatabase as demonstrated in the tutorial, or use the clip tool in ArcMap for those that need clipping. Note that some feature classes may not have features in all states (lakes for example) and the output will be empty.

Answers to Challenge Problem 2

Answers will vary.

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Chapter 3

Answers to Exercises 3

1. The streets feature class has the NAD 1983 State Plane Texas Central coordinate system. It is projected data. The map units are feet.
   Method: Right-click the data set in the Catalog tab, open its properties, and examine the XY Coordinate system tab. Or open it in ArcMap, open its properties, and examine the Source tab.

2. The projection is Lambert Conformal Conic. It has a central meridian of -120.5 and standard parallels of 43 and 45.5. No, it uses 41.75 as its latitude of origin.
   Method: Open the properties of one of the feature classes in ArcMap or ArcCatalog and view the projection information on the Source tab or the XY Coordinate System tab.

3. The coordinate system of the data frame is USA Contiguous Equidistant Conic. The map units are meters. The display units are miles. The layers are in WGS 194 and North America Equidistant Conic.
   Method: Right-click the data frame name and choose Properties. Click the Coordinate System tab to view the coordinate system, and the General tab to view the units.

4. The projections are as follows

   a. Humboldt County, CA. The county is near the edge of State Plane Zone 1 but near the center of UTM Zone 10, so the UTM Zone 10 is slightly better.

   b. Grafton County, New Hampshire State Plane. The county crosses the boundary of UTM Zones 18 and 19, so it is better to use the State Plane zone.

   c. Nevada, UTM Zone 11. The entire state fits neatly in the UTM zone.

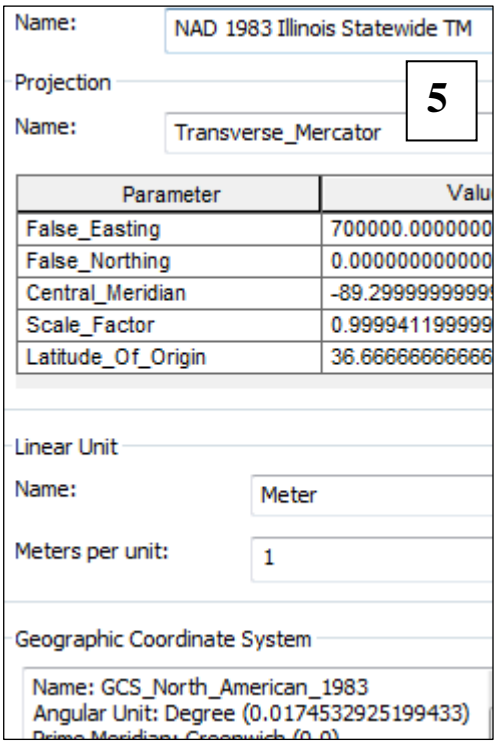
   d. New Jersey, UTM Zone 18. The entire state fits neatly in the UTM zone and is near the center. In this case, though the single State Plane zone would also be fine.

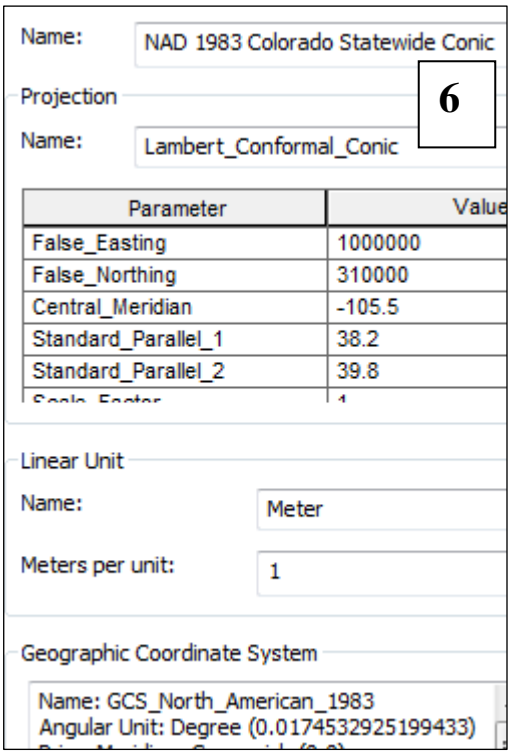
   e. England, British National Grid. Searching for British finds this one coordinate system presumably developed as the best one for GBR.

   f. Antarctica, South Pole Azimuthal Equidistant. Polar regions are best presented with azimuthal projections. Several other projections in the Polar folder might work just as well.

   Method: For the US areas, add the utmzone and spcszones layers and symbolize and label them for easy viewing. Examine where the counties lie and choose the UTM or State Plane zone that they would fall in completely. For the international areas, open the data frame properties coordinate system tab and examine the predefined projection choices until a suitable coordinate system is found.

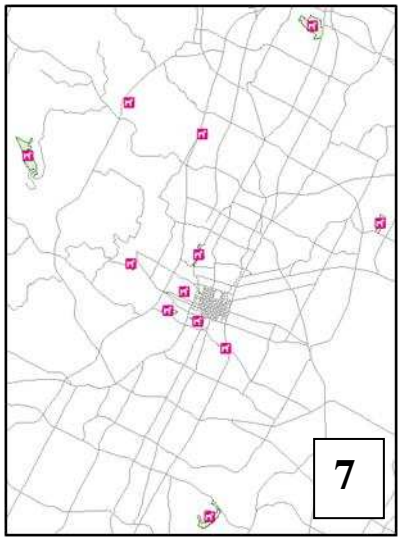
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5. Illinois runs north-south. Start with the Illinois East or West State Plane zone and modify the central meridian to the approximate center of the state. The answer should appear similar to the picture.

6. Colorado runs east-west. Start with the State Plane Central Colorado zone and modify the parallels to about 38.2 and 39.8 to better cover the entire state. You can round the false easting/northing values if desired. The answer should look similar to the picture.



7. The dog_offleash_areas point file has an undefined coordinate system, although it appears to be in NAD 1983 State Plane Texas Central like the other Austin data. The dog_offleash_bnd polygon file is in an unlabeled GCS. The other answer is the map.

   Method: Load the arteries into a new map document. Add the dog point file, which appears but with a warning. Examine the coordinate system to determine that it is unlabeled, and use Define Projection to set it to match the other Austin data in State Plane. Add the dog polygon file, which does not appear. Examine the coordinate system to determine that it is unlabelled and contains degrees. Use Project Define to label it as GCS_NAD_1983, and it then appears with the rest of the data. It can be projected to State Plane if desired, but it is not necessary to make the map.

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8. Answers will vary.

Answer to Challenge Problem 3

Answers will vary.

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Chapter 1

Answers to Review Questions 1

1. A feature is a single spatial object and could be a point, line, or polygon. A feature class is a collection of similar features with the same attribute fields. A feature data set is a collection of feature classes that share a common theme and coordinate system.
2. There are 3 feature classes, 650 features, 3 attribute tables, and 650 records in the database.
3. Rainfall, temperature, and slope are continuous data types. Voting districts, soil types, and vegetation types are all discrete data types for categorical data.
4. The two GPS units are set to record location in different coordinate systems. To get matching locations, one would need to set his/her unit to record in the same coordinate system as the other.
5. Vector would be a better choice. Vector can store features with greater precision, important when storing property boundaries. Vector can store multiple attributes for each parcel. Vector can store the parcel data more efficiently with less storage space for the same resolution in raster.
6. The length of field in inches is 100 yd × 36 in./yd = 3600 in. Set up the ratio 0.5 in./3600 in. = 1/x, yielding x = 7200. The scale is thus 1:7200.
7. The boundary is being located by the GPS with a relatively high precision, so I would consider it precise. However, interpreting the location of the boundary is subjective, and the boundary itself may move over time depending on climate and precipitation, so the accuracy is not that high.
8. The crop field can be well defined for a single moment in time as it is very clear what is growing. However, the crop type could change from year to year. The organic matter value of the soil probably changes from place to place within the field, and may also vary from year to year, and so can only be considered a representative value. Knowing how it was determined might be important.
9. GIS servers can only be accessed over the Internet, so a connection must be available. Many GIS servers provide only the data requested rather than the entire data file. GIS services can be used by many kinds of devices, not just a Windows computer. GIS servers have more sophisticated security measures than local data.
10. Mastering ArcGIS ,Tutorial Data 7th edition (2015) [DVD-ROM]. McGraw-Hill Higher Ed: Dubuque, Iowa.

Answers to Tutorial Questions 1

1. The county name is Wallowa.
2. There are 36 rows in the table.
3. The smallest county is named Wheeler.
4. The name of the MapTips field is NAME.
5. The NOAA National Weather Service provides the information, and the USGS hosts the GIS server.

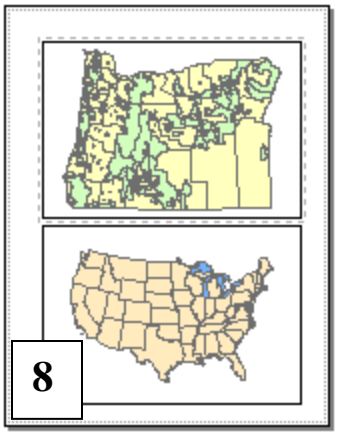
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   Method: Open the attribute table for counties and do a query for STATE_NAME = 'California'

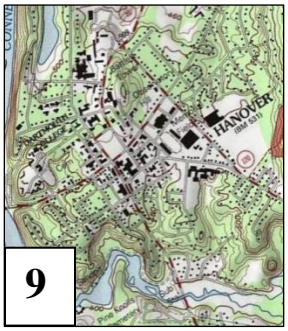


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   Method: Open the county attribute table and use Find to locate Itawamba in the table.

6. The average 2010 state population density is 338 people/sq mi. The minimum is 1 and the maximum is 8833.
   Method: Open the states attribute table, right-click the POP10_SQMI field and choose Statistics.

7. The other four feature class types are annotation, dimensions, multipoints, and multipatches.
   Method: Open Help and type "feature classes" in the Search tab. Find the feature class basics entry.



8. See map.
   Method: Create two data frames and arrange them on the page. Activate one, add the required data, and set the symbols. Repeat for the second.

9. Answers will vary; see map for example using Dartmouth College.
   Method: Search for 'topo' and add the USA Topo Maps service to the map. Zoom to the campus.

10. See map.
    Method: Add the feature classes to a new blank map. Open the Layers data frame properties and choose the Predefined > Projected > World > Robinson coordinate system.



Answer to Challenge Problem 1

Answers will vary.

Chapter 2

Answers to Review Questions 2

1. You should avoid using any characters except letters, numbers, and the underscore character. Spaces, although permitted, can cause problems and should not be used.

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2. File extensions identify the type of file and is used by the computer to determine which application is used to open it.
3. Many data sets on ArcGIS Online cannot be saved locally. Also the quality can be variable.
4. Data created for the book can use the shortened, informal style of metadata meant mainly for the creator, because it most cases the data will not be given to anyone else.
5. A layer file does not store any actual spatial data, so the layer file size for the two spatial data sets would not be significantly different.
6. It means that the layer has lost track of the feature class or raster that it refers to, and cannot find the data. Fixing it requires resetting the path to the correct location.
7. See table

Move the mgisdata folder to a USB stick			Copy the map documents to a USB stick to take to school and print			Move the Njdata geodatabase to the the mgisdata folder			Rename the MyProject folder to NJProject		
	Abs	Rel		Abs	Rel		Abs	Rel		Abs	Rel
NjProj	no	yes	NjProj	no	no	NjProj	no	no	NjProj	no	no
USProj	no	yes	USProj	no	no	USProj	yes	yes	USProj	yes	yes
NJmap	no	yes	NJmap	no	no	NJmap	no	no	NJmap	no	yes
USmap	no	yes	USmap	no	no	USmap	yes	yes	USmap	yes	yes

8. Both programs can put file locks on data to signify it is in use; if the other program tries to modify a file locked by another, an error will result, and the action can't be completed.
9. A query selects a set of records based on an expression such as STATE = 'California'. You might use it to copy only a subset of features from the original source.
10. The summary is a quick statement of the purpose or intended use of the data. The Description explains more about what it contains and how it may have been developed.

Answers to Tutorial Questions 2

1. The cell size is 1000 meters. There are 696 columns and 495 rows.
2. There are 2 coverages, 1 table, 1 raster, 1 layer file, and 7 shapefiles.
3. Use the Expression ST = 'NJ'.
4. The feature class contains congressional districts.
5. Use the Expression STATE_ABBR = 'NJ'
6. Feature classes are stored on disk and can be managed by ArcCatalog. Layers exist only in ArcMap and are managed by setting properties in the Table of Contents.
7. The publication date information was found by accessing and reading the metadata on the web site.
8. No, it does not need projecting. It is already in NJ State Plane.
9. Esri Data and Maps files use the WGS 1984 Geographic Coordinate System.

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Answers to Exercises 2

1. There are two feature datasets, Transportation and Water. There are 14 feature classes and 5 rasters.
   Method: Use the Catalog tab to examine the geodatabase.
2. It has 1609 rows and 1964 columns, and a cell size of 30 meters. It has 8 bands. The coordinate system is WGS_1984 UTM Zone 10N.
   Method: In the Catalog tab, right-click the raster in the Oregon folder and open its Properties. You will find all the necessary information here.
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5. Answers will vary.
6. **Method:** Right-click the appropriate location to create the folder and geodatabase. Given them appropriate names.
7. Exact expression will vary for each state, but for New Jersey the list would look like this:
   Interstates: clip
   Majroads: clip
   Cd110: STATE_ABBR = 'NJ'
   Cd111: STATE_ABBR = 'NJ'
   Cities: ST = 'NJ'
   Counties: STATE_NAME = 'New Jersey'
   Lakes: clip
   Quakehis: STATE = 'NJ'
   Rivers: clip
   Spcszn83: clip
   States: STATE_NAME = 'New Jersey' or STATE_ABBR = 'NJ'
   Volcanoes: clip
8. Answers 8-10 will vary.
   Method: Use ArcMap to query and export to the home state geodatabase as demonstrated in the tutorial, or use the clip tool in ArcMap for those that need clipping. Note that some feature classes may not have features in all states (lakes for example) and the output will be empty.

Answers to Challenge Problem 2

Answers will vary.

Chapter 3

Answers to Review Questions 3

1. The data are using a geographic coordinate system, and the units are in degrees.
2. The origin always has *x*-*y* coordinates of 0,0. The Central Meridian has an *x*-coordinate of zero.

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3. A spheroid is a smooth, mathematical representation of a sphere with a different major and minor axis. A geoid is an irregular shape representing the mean sea level elevation of the earth.
4. Conic projections have decreasing lengths of the parallels as you approach the poles, which mimics the decrease in the circumference of the earth towards the poles. Hence the distances do not get distorted with increasing distance from the equator. Since distance is not distorted, areas generally aren't either. In a cylindrical projection the longitudes are always projected straight up and down, so direction won't be distorted.
5. Rasters must be resampled to a new cell grid after transforming or projecting them. New cell values are generated for the new grid based on one of three resampling methods. Nearest neighbor grabs the value of the cell closest to the center of the new grid. Bilinear and cubic convolution interpolate values based on the four or sixteen closest cells.
6. The Prime Meridian is the longitude line on earth defined as zero, and it runs through Greenwich, England. A central meridian is the center of a map projection where $x = 0$, and may be any longitude line.
7. You will use the Define Projection tool to set the coordinate system label to UTM Zone 13 NAD 1983.
8. False. The extent is the range of *x*-*y* values, and the United States in GCS would have positive decimal degrees for *y* because it is north of the equator, but negative degree values for *x* because it is west of the Prime Meridian.
9. You will use the Project tool to convert the shapefile to a new shapefile with the Oregon Statewide coordinate system.
10. Idaho is split between UTM Zones 11 and 12, and has three State Plane Zones, so one single predefined coordinate system is not available. You could (1) start with a UTM zone and redefine the central meridian through the center of the state, (2) just use the central State Plane zone (which would almost be the same thing). The state is more north-south, so UTM is better than a conic projection.

Answers to Tutorial Questions 3

1. The coordinate system is GCS_WGS_1984 with units of degrees.
2. The coordinates of Florida's tip are about –80° and 25°.
3. The map units and the display units are decimal degrees.
4. Florida's coordinates are now approximately –5550 and 1740 miles.
5. The Mercator map units are meters.
6. South America would have mostly negative coordinates, Asia would have mostly positive coordinates.
7. This warning appears because the states GCS is NAD 1983, but the World data frame GCS is in WGS 1984.
8. It will not choose a transformation automatically; that only happens for converting NAD 1927 to NAD 183, when it uses NADCON.
9. The central meridian is –96° and the latitude of origin is 40°. The parallels are 20 and 60 degrees.
10. Yes, because the latitude of origin lies between the standard parallels.

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