-	Desktop GIS Functionality Matrix					If you have comments add them below (keep it clean please!)
		QGIS	ArcMap (Info/Advanced)	GRASS GIS	ArcGIS Pro ?	Should also be added?
1	Display Earth Resources Laboratory Applications Software (ELAS) datasets		YES			
2	Consume Enhanced Compression Wavelet (ECW)	YES*	YES	YES*		If GDAL compiled with ECW support (out the box for windows installer IIRC)
3	Geospatial Data Abstraction Library (GDAL)	YES*	YES	YES*		
4	Display LAS (Lidar Data Files)	NO*	YES	YES*		QGIS: Can be used with LAStools plugins; GRASS: If compiled with libLAS (in Windows installer).
5	Display LAS Datasets	NO*	YES	YES*		QGIS: Can be used with LAStools plugins; GRASS: If compiled with libLAS (in Windows installer).
6	Display LASZ Compressed LAS	NO	YES	YES*		GRASS: .laz supported if libLAS is compiled with LAZlib (in Windows installer)
7	Reshape Existing Features	YES	YES	YES*		
8	Cut Polygon Features	YES	YES	YES		
9	Buffer Features	YES	YES	YES		
10	Create New Features	YES	YES	YES		
11	Create New Features from the Buffer	YES	YES	YES		
12	Create New Polygons	YES	YES	YES		
13	Modify Each Selected Row Individually or as a Group (Attributes Dialog)	YES, NO	YES	YES*		GRASS lets you update attributes via SQL statements (v.db.update)
14	Split Lines	YES	YES	YES		
15	Explode (multi-part) Features	YES	YES	YES		
16	Simplify Features	YES	YES	YES		
17	Topology Rules Can Create	?	YES	YES		There is support for topological editing , GRASS multiple options under v.clean
18	Report Topology Errors	YES	YES	YES		Topology plugin has this feature, AFAIK this is better than Arc
19	Add Rule to Topology	?	YES	YES		Topology plugin has this feature, AFAIK this is better than Arc
20	Create Topology	?	YES	YES		Can be done via processing tools
21	Validate Topology	?	YES	YES		Topology plugin has this feature, AFAIK this is better than Arc
22	*Snapping Geometry*	YES	YES	YES		
23	Create a Database View	YES	YES	YES		GRASS (db.execute)
24	Add web map service to a data view	YES	YES	YES*		in GRASS case that is import from WMS
25	Add web feature service to a data view	YES	YES	YES*		in GRASS case that is data import from WFS
26	Read/display/consume shapefiles	YES	YES	YES		
27	Read/display/consume file geodatabase	YES	YES	YES?		
28	Read MS Excel file format	YES	YES	YES		
29	Read DBF file format	YES	YES	YES		
30	Layout and symbolize a map to display data	YES	YES	YES		
31	Create multiple layouts for one "map document"	YES	YES	YES		
32	Insert a second data frame	YES	YES	NO		Concept is different in QGIS to ESRI - QGIS additional maps can be based on map themes / presets; Yes in QGIS 3.0
33	Insert an inset map in the layout	YES	YES	NO		
34	Export a map in optional formats	YES	YES	YES		
35	Advanced cartography tools (e.g., annotation)	YES	YES	YES		QGIS does not have the same annotation tools as ESRI but has many advanced cartography tools
36	Export a data window in optional formats	YES	YES	YES		
37	Select records by a query of attributes	YES	YES	YES		
38	Select records by location	YES	YES	YES		GRASS (v.select)
39	Select records interatively in a table	YES	YES	NO		
40	Select records interactively in a map	YES	YES	NO		
41	Export a selection of records	YES	YES	YES		
42	Bookmark a map extent	YES	YES	YES		
43	Change the map scale of a data window	YES	YES	YES		
44	Define the projection of a data layer	YES	YES	YES		
45	Re-project a dataset	YES	YES	YES		
46	Join a table to a data layer	YES	YES	YES		
47	Join the table of a polygon data layer to a point data layer based on point location within a polygon	YES*	YES	YES		File to file operation using spatial join
48	Buffer a feature or selected features	YES	YES	YES		
49	Clip one dataset based on another dataset	YES	YES	YES		
50	Intersect features	YES	YES	YES		
51	Union features	YES	YES	YES		
52	Merge features	YES	YES	YES		
53	Dissolve features	YES	YES	YES		
54	Manage datasets in a catalog	NO	YES	YES		
55	Create and edit features	YES	YES	YES		
56	Digitize from source map	YES	YES	YES		
57	Advanced editing	YES	YES			Too vague, how is advanced editing defined?
58	Snap to basemap layers	YES	YES			
59	Snap to feature service layers	YES	YES	NO		ESRI jargon here but yes can snap to OGC WFS service layers or any vector layer
60	Build a model of processes and output	YES	YES	YES		
61	Read raster formats (MrSID, TIFF, GIF, JPEG2000)	YES*	YES	YES*		MRSID requires proprietary extensions for GDAL
62	Spatial analysis	YES	YES	YES		
63	3D analysis	NO*	YES	YES		QGIS 3 ships with enhanced support for 3D geometries and with a new 3D visualisation tool
64	Extract, overlay, proximity, statistics		YES			Need to check (Yes via DB Manager and SQL statements)
65	Generalize data	YES	YES	YES		QGIS includes on-the-fly feature generalisation for rendering
66	Convert vector to raster	YES	YES	YES		
67	Raster processing	YES	YES	YES		Only simple raster calculator operations, or analysis via SAGA/GRASS/OTB
68	Classify a raster dataset	YES*	YES	YES		Via GRASS also SCP plugin and OTB, SAGA, + PKtools
69	Create a mosaic dataset	YES	YES	YES		Yes in QGIS
70	Create LAS dataset	NO	YES	NO		Yes in QGIS using Lastools but has limitation(fremium), and other 3rd party
71	Metadata editing, import, export	Planned	YES			QGIS 3.0 provides metadata support bbut not yet export / import from ISO19115 and similar formats
72	Generate tile cache tiling scheme		YES			
73	Geocode addresses	PLUGIN	YES			
74	Reverse geocode	PLUGIN	YES			
75	Spatial statistics	YES	YES	YES		
76	Analyze a (road) network	YES	YES	YES		
77	Linear referencing tools	PLUGIN	YES	YES		

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78	Create and edit metadata templates	PLANNED	YES			
79	Create and edit valid metadata records	PLANNED	YES			
80	Validate metadata records	PLANNED	YES			
	ADDITIONAL PROPOSED CONSIDERATIONS (added by Tim since above questions all seem orientated towards ESRI)					
81	Can be easily improved by direct developer contracting	YES	NO	YES		
82	Can be distributed freely with no per-seat license fees	YES	NO	YES		
83	Can be used independently of a license manager	YES	YES	YES		
84	Can integrate tools from GRASS	YES	NO	YES*		It *is* GRASS
85	Can integrate tools from Orfeo Toolbox	YES	NO	YES		
86	Can integrate tools from SAGA	YES	NO	YES		Since the Licensing is the same (GPL) , the source code for QGIS, SAGA , aand GRASS can be freely mixed. Since SAGA has a python api, it can beaccessed by GRASS and QGIS
87	Has a rich ecosystem of free plugins which can be added to and easily distr	YES	YES, many available in ArcGIS Online.	YES		GRASS has an addon repository, https://grass.osgeo.org/grass72/manuals/addons/ and QGIS has a plugin repository , https://plugins.qgis.org/
88	Runs on major operating systems including MacOS, Windows, Linux	YES	NO	YES		
89	Has an open development process	YES	NO	YES		
90	Has a server component for publishing web maps	YES	YES*	YES*		Yes, with ArcGIS Online or ArcGIS Enterprise (Portal, Server) , GRASS can be called by existing mapserver software to perform analysis on the fly, see http://www.gapserve.ncsu.edu/ncgap/ncgap/
	WIDE WORLD, ADD YOUR QUESTIONS BELOW					
91	Help can be used offline in a disconnected environment	PLANNED*	YES	YES		Or is this done yet? Arc map has offline help or manual via search tool that documents how a tool is used. (Yes, ArcMap and other ArcGIS applications are fully supported in disconnected environments)
92						
93						
94	Full PostGIS read/write without extra licensing or plug-ins	YES	NO	YES		
95	Add google maps basemap to map	YES	NO	NO		This is likely against Google Maps Terms of Use
96	Full support for GeoPKG format read/write without extra plug-ins	YES	NO	YES		QGIS 3,0 really amps up GeoPackage support too
97	Full Oracle read/write wo extra licensing or plugins	YES		Maybe		GRASS , needs to have oracle interface compiled into GDAL, may be standard on windows build, not sure
98	SQLite/Spatialite support	YES	YES	YES*		via ogr support
99	Support for other languages besides English	YES	YES	YES		
100	Dynamic hillshade calculation/visualisation of elevation model	YES	YES	YES		
101	Can Create and View mbtiles	eate plugin, view nativ	NO	YES		
102	Run on headless servers as data processing service (from commandline, API)		YES	YES		
103	SQL like querying and filtering	YES	YES	YES		QGIS = yes for filtering data + ability to connect to PostGIS and Spatialite
104	Can integrate powerful statistics analysis package e.g. R	YES	YES, with add-in	YES		Free connnection to Esri (ArcMap or ArcGIS Pro) through the R Bridge: https://r-arcgis.github.io/
105	Can integrate OSM features in a basemap	YES	YES with add-in	YES		Qgis offers more than just the OSM basemap, data can be downloaded, stored in post gis and more
106	Has a license	YES	YES	YES		Should be Yes as GPL is a licence, as all software has a license... Maybe change question to "Has Open Source license?"
107	No software maintenance fee	YES	NO	YES		
108	Zonal statistics works with overlapping polygons	YES	NO	YES		
109	Feature-level display opacity	YES	YES	NO		Recently added in ArcGIS Pro
110	Do not need to purchase separate license to use some of the features	YES	NO	YES		
111						
112	Accessibility (not my area but essential to asses)					
113	Visualisation			YES		QGIS 3 +data plotly plugin for data viz , GRASS can do 3D visualization and can generate fly through videos
114	Custom icons supported	YES	YES	YES		
115	Attribute and expression based styling	YES	YES	NO		
116	Takes 2+ minutes to start up	NO*	YES	NO		Normally quick to start on modern hardware, but startup times depend on which plugins are installed
117	SLD export	YES		NO		SLD does not always provide a 1:1 fidelity to the original QGIS Style
118	Can read DWG files	YES	YES			
119	FLIP/Reverse Lines	YES*	YES	YES		QGIS via python script. GRASS (v.flip) ESRI (geoprocessing toolbox)
120						
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