Assignment #1
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Question 1

List the various components of Arc Map:

Item	Label
1.	Arc Map Window
2.	Menubar
3.	Toolbar
4.	Table of Contents pane
5.	Table of Contents toolbar
6.	Layers pane
7.	The individual layers
8.	Map tools
9.	Map pane
10.	Toolbox pane
11.	The individual tools
12.	Catalog pane
13.	The Ottawa geo database
14.	The data for the Ottawa database
15.	The individual components making up the Ottawa database
16.	An Esri shape file which can be used to store geographic information
17.	The scale information

Question 2

Using the formula $d = lat \cdot \left(\frac{\pi}{180}\right)$ it is possible to solve for the distances:

Latitude	Distance (km)
10	109.3
45	78.5
54	65.2
60	55.5
89	1.9

As the latitude increases the distance at 1 degree decreases.

Question 3

Latitude	Longitude	Latitude dd	longitude dd
45°00'38" N	75°43'12" W	+45.0106 N	-75.7200 W
45°11'12" N	75°50'46" W	+45.1867 N	-75.8486 W
45°14'15" N	75°28'02" W	+45.2375 N	-75.4672 W
45°15'27" N	76°03'52" W	+45.2575 N	-75.0644 W
45°17'37" N	75°52'22" W	+45.2936 N	-75.8727 W
45°19'30" N	75°36'06" W	+45.3250 N	-75.6016 W
45°19'42" N	75°53'60" W	+45.3283 N	-75.9000 W
45°20'31" N	76°01'50" W	+45.3419 N	-75.0305 W
45°20'32" N	75°43'25" W	+45.3422 N	-75.7236 W
45°21'01" N	75°45'53" W	+45.3503 N	-75.7647 W
45°21'01" N	75°21'10" W	+45.3503 N	-75.3527 W
45°21'48" N	75°47'23" W	+45.3633 N	-75.7897 W
45°22'14" N	75°41'25" W	+45.3705 N	-75.6902 W
45°22'25" N	75°57'20" W	+45.3736 N	-75.9555 W
45°23'00" N	76°11'39" W	+45.3833 N	-75.1941 W
45°22'56" N	75°44'28" W	+45.3988 N	-75.7411 W
45°22'56" N	75°39'41" W	+45.3988 N	-75.6613 W
45°28'01" N	75°29'26" W	+45.4669 N	-75.4905 W
45°28'19" N	75°32'58" W	+45.4719 N	-75.5494 W
45°29'56" N	76°05'13" W	+45.4989 N	-75.0869 W

Question 4

Using the base scale uncertainty formula $\delta = \frac{0.25mm \cdot \text{scale denom}}{1000}$

Scale	Uncertainty (m)
1:1000	0.25
1:25000	6.25
1:63360	15.84
1:250000	62.5
1:5000000	1250

Question 5

By analyzing the results in question four it is possible to conclude that as the scale increases so does the uncertainty. This is likely due to the digitization process for a larger scale can cause more inaccuracies since it is quite difficult to perfectly map out 100% accurately.

Question 6

Using the base location uncertainty formula for digitized layers based off of the notes $\delta = \sqrt{\text{base error}^2 + \text{digital error}^2}/1000$

Scale	Uncertainty (m)
1:1000	0.35
1:25000	8.84
1:63360	22.40
1:250000	88.34
1:5000000	1767.77

Question 7

Using the raster uncertainty formula based off of the notes
$$\delta = \sqrt{\text{base error}^2 + \text{digital error}^2 + \text{raster error}^2/1000}$$

Scale	Uncertainty (m)
1:1000	0.42
1:25000	8.98
1:63360	22.73
1:250000	88.64
1:5000000	1767.90

Question 8

As seen in ArcMap 10.5 when exporting the data you get:

mine_entrance

FID	Shape	Id	L27	LN27	L83	LN83	DST
0	Point	100	46.620061	-84.303857	46.620094	-84.30383	4.265151
1	Point	101	42.782869	-82.042783	42.782909	-82.042685	9.158386
2	Point	102	44.943589	-75.811322	44.943641	-75.811	26.043453
3	Point	103	48.637029	-73.781057	48.637087	-73.780608	33.67649
4	Point	104	65.58964	-102.24263	65.590017	-102.243297	51.962508
5	Point	105	64.315594	-125.273591	64.315677	-125.275369	86.2622
6	Point	106	67.11359	-106.355014	67.113996	-106.35602	62.725276
7	Point	107	50.479854	-123.650056	50.479696	-123.651461	101.095787
8	Point	108	53.257891	-128.210057	53.257716	-128.211739	113.677659
9	Point	109	52.974604	-122.233622	52.974548	-122.235055	96.229654
10	Point	110	50.000278	-104.521859	50.000314	-104.522412	39.813996

When exporting the data from ArcMap 10.5 the following columns are exported: L27 is the latitude in NAD27, LN 27 is the longitude in NAD27, L83 is the latitude in NAD83, and LN83 is the longitude in NAD83. The DST column is the distance between the two points in Meters. When sorting the data based on the distance it appears that the further apart the points are the further apart the longitudes and latitude values are in NAD27 and NAD83.