ERTA Lab 3

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Background

x	y
0	-2.12
1	15.7791
2	33.632
3	51.4351
4	69.1848
5	86.8775
6	104.5096
7	122.0775
8	139.5776
9	157.0063
10	174.36
11	191.6351
12	208.828
13	225.9351
14	242.9528
15	259.8775
16	276.7056
17	293.4335
18	310.0576
19	326.5743
20	342.98
21	359.2711
22	375.444
23	391.4951
24	407.4208
25	423.2175
26	438.8816
27	454.4095
28	469.7976
29	485.0423
30	500.14
31	515.0871
32	529.88
33	544.5151
34	558.9888
35	573.2975
36	587.4376
37	601.4055
38	615.1976
39	628.8103
40	642.24
41	655.4831
42	668.536
43	681.3951
44	694.0568
45	706.5175
46	718.7736
47	730.8215
48	742.6576
49	754.2783
50	765.68
51	776.8591
52	787.812
53	798.5351
54	809.0248
55	819.2775
56	829.2896
57	839.0575
58	848.5776
59	857.8463
60	866.86
61	875.6151
62	884.108
63	892.3351
64	900.2928
65	907.9775
66	915.3856
67	922.5135
68	929.3576
69	935.9143
70	942.18
71	948.1511
72	953.824
73	959.1951
74	964.2608
75	969.0175
76	973.4616
77	977.5895
78	981.3976
79	984.8823
80	988.04
81	990.8671
82	993.36
83	995.5151
84	997.3288
85	998.7975
86	999.9176
87	1000.6855
88	1001.0976
89	1001.1503
90	1000.84

Part 1

Question 1:
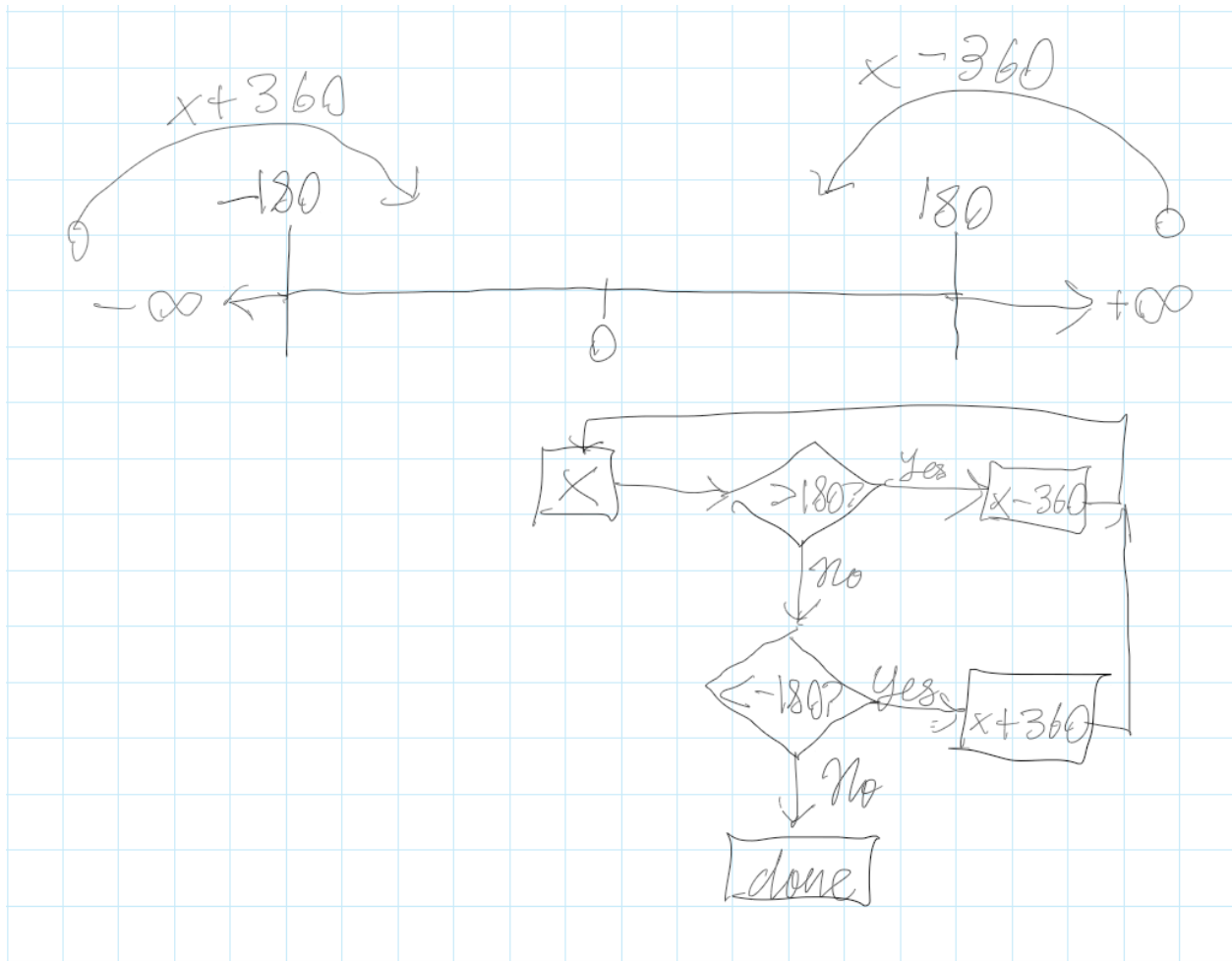
Question 2:
The if else statements separate the input of the sin function into the four quadrants, since different negative & positive signs must be applied when calculating sine in the different quadrants. Sine has positive applied to it in Quadrant I and Quadrant II, sine has negative sign applied to it in Quadrant III and Quadrant IV.

Question 3:

x	Excel Calculations	`fsin`
2	33.632	-33
3	51.4351	-51
4	69.1848	-69
5	86.8775	-86

Part 2

Question 1:
The value t converges after 7 iterations.

Question 2:
The function takes 444 units of time to execute as is.

Question 3:
Old Elapsed Time: 444 units of time

Expression	Type	Value	Address
(x)= Results	unknown	identifier not found: Results	
(x)= tt	unsigned int	480	0x2000000C
(x)= elapsed	unsigned int	444	0x20000004
Add new expression			

New Elapsed Time: 356 units of time

Expression	Type	Value	Address
(x)= Results	unknown	identifier not found: Results	
(x)= tt	unsigned int	480	0x2000000C
(x)= elapsed	unsigned int	356	0x20000004
Add new expression			

Part 3

Name	Type	Value	Location
(x)= adc	int	12995	0x2000FFE4
(x)= diff	int	0	0x2000FFF0
(x)= distance	int	100	0x2000FFE8
(x)= errors	int	0	0x2000FFEC
(x)= i	int	16	0x2000FFE0

```
67 #define IRSlope 1195172
68 #define IROffset -1058
69 #define IRMax 2552
70
71 int32_t Convert(int32_t n){
72   if (n < IRMax) {
73       return 800;
74   }
75   int32_t distance = IRSlope / (n + IROffset);
76   return distance; // replace this line
77 }
```