Problem 1).

```
(gdb) run[1, 2, 3]
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec [1, 2, 3]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Number of rectangles: 768
Previous Approximation: 38.666703
Current Approximation: 38.666676
[Inferior 1 (process 2134) exited normally]
(gdb) run[1, 2]
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec [1, 2]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Invalid number of arguments.[Inferior 1 (process 2135) exited with code 01]
(gdb) run[1, 2, 3, 4]
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec [1, 2, 3, 4]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Invalid number of arguments.[Inferior 1 (process 2136) exited with code 01]
(gdb)
```

Here I show that if you run with 2 inputs and 4 inputs it does not work. It only works if 3 arguments are given

Problem 2).

```
(gdb) run[1, 2, 3]
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec [1, 2, 3]
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".

Breakpoint 1, main (argc=4, argv=0x7fffffffe468) at midpoint_gold.c:34
34          int n = atof(argv[3]);
(gdb) print argv[1]
$1 = 0x7fffffffe706 "[1,"
(gdb) print argv[2]
$2 = 0x7fffffffe70a "2,"
(gdb) print argv[3]
$3 = 0x7fffffffe70d "3]"
(gdb)
```

Here I print out the values of argv[1-3] to show that they are all pure numbers

Problem 3).

```
(gdb) run 1 2.3xyz 3
The program being debugged has been started already.
Start it from the beginning? (y or n) y
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec 1 2.3xyz 3
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Number of rectangles: 192
Previous Approximation: 21.568958
Current Approximation: 21.568911
[Inferior 1 (process 2143) exited normally]
(gdb)
```

This demonstrates that even with the letters it will still run and provide an output

Problem 4).

```
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec 2 1 3
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".
Lower bound cannot be greater than upper bound.[Inferior 1 (process 2144) exited with code 01]
(gdb)
```

This demonstrates that with an improper bound such as the lower bound being higher than the upper bound it stops the program and exits properly

Problem 5).

```
(gdb) break 9
Note: breakpoints 4 and 5 also set at pc 0x5555555551d9.
Breakpoint 6 at 0x5555555551d9: file midpoint_gold.c, line 9.
(gdb) run 1 2 3
The program being debugged has been started already.
Start it from the beginning? (y or n) y
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec 1 2 3
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".

Breakpoint 4, func (x=1.1666666666666667) at midpoint_gold.c:9
9           return f;
(gdb) print f
$7 = 21.206018518518519
(gdb)
```

Here is set a break point within the func() to inspeact and show teh value of f

Problem 6).

```
(gdb) break 21
Breakpoint 12 at 0x55555555528d: file midpoint_gold.c, line 21.
(gdb) run 1 2 5
The program being debugged has been started already.
Start it from the beginning? (y or n) y
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec 1 2 5
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".

Breakpoint 12, midpoint (a=1, b=2, n=5) at midpoint_gold.c:21
21          return result;
(gdb) print result
$14 = 18.2225
(gdb)
```

This shows the value of result in one excitcation of the midpoint function

Problem 7).

```
(gdb) clear
Deleted breakpoint 13
(gdb) break 48
Breakpoint 14 at 0x5555555553bd: file midpoint_gold.c, line 48.
(gdb) run 1 2 4
The program being debugged has been started already.
Start it from the beginning? (y or n) y
Starting program: /home/ubuntu/Home/Desktop/Year2/CS382/myexec 1 2 4
[Thread debugging using libthread_db enabled]
Using host libthread_db library "/lib/x86_64-linux-gnu/libthread_db.so.1".

Breakpoint 14, main (argc=4, argv=0x7fffffffe468) at midpoint_gold.c:48
48              ap2 = midpoint(a,b,n);
(gdb) print ap2
$15 = 18.2138671875
(gdb) c
Continuing.

Breakpoint 14, main (argc=4, argv=0x7fffffffe468) at midpoint_gold.c:48
48              ap2 = midpoint(a,b,n);
(gdb) print ap2
$16 = 18.209716796875
(gdb) c
Continuing.

Breakpoint 14, main (argc=4, argv=0x7fffffffe468) at midpoint_gold.c:48
48              ap2 = midpoint(a,b,n);
(gdb) print ap2
$17 = 18.20867919921875
(gdb) c
Continuing.

Breakpoint 14, main (argc=4, argv=0x7fffffffe468) at midpoint_gold.c:48
48              ap2 = midpoint(a,b,n);
(gdb) print ap2
$18 = 18.208419799804688
(gdb) c
Continuing.
Number of rectangles: 128
Previous Approximation: 18.208420
Current Approximation: 18.208355
[Inferior 1 (process 3551) exited normally]
(gdb)
```

This shows the values of the approximations(ap2) as they get more accurate