

Writeup

- analyzes the differences in output of program vs. output from <math.h>
- provide reasoning for differences in outputs

- E.c:-

```
e() = 2.718281828459046, M_E = 2.718281828459045, diff = 0.000000000000000
```

I understood the formula and converted to C

- Madhava.c:-

```
pi_madhava() = 3.141592653589794, M_PI = 3.141592653589793, diff = 0.0000000000000000001
```

This was complicated so it's a bit off cause it requires a lot of iteration and if and else statement plus following the formula with the roots was kinda confusing. But then I realized my code was wrong and did the math and corrected it so that the loop is actually breaks

- Euler.c:-

```
pi_euler() = 3.141592558095893, M_PI = 3.141592653589793, diff = 0.000000095493900
```

Euler was less than madhava cause it was an easier to understand formula so my number is not off and try to make it in ten code and less

- Bbp.c:-

```
rgcharai@cse13s:~/cse13s/asgn2$ ./mathlib-test -b
```

- ```
pi_bbp() = 3.141592653589793, M_PI = 3.141592653589793, diff = 0.0000000000000000
```

Was the closest to the real number cause I accurately figured out the numbers needed to be added, divided and multiplied. I did mess up in iteration by putting += instead of \*= which messed up the code making it way off but was corrected immediately.

- Viète.c:

```
pi_viete() = 3.141592653589789, M_PI = 3.141592653589793, diff = 0.000000000000004
```

This is not that off, as it was easier when I wrote it down and imagined the code by using more variables following the formula.

- Newton.c:-

```

sqrt_newton(5.900000) = 2.428991560298223, sqrt(5.900000) = 2.428991560298223, diff = 0.000000000000
000
sqrt_newton(6.000000) = 2.449489742783177, sqrt(6.000000) = 2.449489742783177, diff = 0.000000000000
000
sqrt_newton(6.100000) = 2.469817807045692, sqrt(6.100000) = 2.469817807045693, diff = 0.000000000000
000
sqrt_newton(6.200000) = 2.489979919597745, sqrt(6.200000) = 2.489979919597745, diff = 0.000000000000
000
sqrt_newton(6.300000) = 2.509980079602225, sqrt(6.300000) = 2.509980079602225, diff = 0.000000000000
000
sqrt_newton(6.400000) = 2.529822128134702, sqrt(6.400000) = 2.529822128134702, diff = 0.000000000000
000
sqrt_newton(6.500000) = 2.549509756796391, sqrt(6.500000) = 2.549509756796391, diff = 0.000000000000
000
sqrt_newton(6.600000) = 2.569046515733024, sqrt(6.600000) = 2.569046515733024, diff = 0.000000000000
000
sqrt_newton(6.700000) = 2.588435821108956, sqrt(6.700000) = 2.588435821108956, diff = 0.000000000000
000
sqrt_newton(6.800000) = 2.607680962081058, sqrt(6.800000) = 2.607680962081058, diff = 0.000000000000
000
sqrt_newton(6.900000) = 2.626785107312738, sqrt(6.900000) = 2.626785107312738, diff = 0.000000000000
000
sqrt_newton(7.000000) = 2.645751311064589, sqrt(7.000000) = 2.645751311064589, diff = 0.000000000000
000

```

It's really accurate as I followed the pseudo code professor provided and just changed it to C.