Homework #1

I used the closest representation that doesn't exceed the actual value

① Ⓐ 1643.01004 $S=0$

$\overset{+}{\leftarrow}\ \overset{-}{\rightarrow}$ 11001101011.000000101001000 1

+10 shift $0\cdot2^{-1}+0\cdot2^{-2}+0\cdot2^{-3}+0\cdot2^{-4}+0\cdot2^{-5}+0\cdot2^{-6}+1\cdot2^{-7}+0\cdot2^{-8}+1\cdot2^{-9}$
$+0\cdot2^{-10}+0\cdot2^{-11}+1\cdot2^{-12}+0\cdot2^{-13}+0\cdot2^{-14}+0\cdot2^{-15}+1\cdot2^{-16}$

$127+10=137=10001001$

$\boxed{0\ 10001001\ 1001101011000000101001 0}$

Ⓑ 2017.08021

+10 shift 11111100001.000101001000100 0101

$0\cdot2^{-1}+0\cdot2^{-2}+0\cdot2^{-3}+1\cdot2^{-4}+0\cdot2^{-5}+1\cdot2^{-6}+0\cdot2^{-7}+0\cdot2^{-8}+1\cdot2^{-9}+0\cdot2^{-10}+0\cdot2^{-11}+0\cdot2^{-12}$
$+1\cdot2^{-13}+0\cdot2^{-14}+0\cdot2^{-15}+0\cdot2^{-16}+1\cdot2^{-17}+0\cdot2^{-18}+1\cdot2^{-19}$

$127+10=137=10001001$

$\boxed{0\ 10001001\ 1111100001000101001000 1}$

②Ⓐ 0 11100011 0111 0000 0000 10...

$227-127=100$

$2^{100}\cdot\left(1+2^{-2}+2^{-3}+2^{-4}+2^{-13}\right)\approx\boxed{1.8224025\times10^{30}}$

Ⓑ 1 01011101 0.10011 01 0000 100 110...

$93-127=-34$

$-1\cdot2^{-34}\cdot\left(1+2^{-2}+2^{-5}+2^{-6}+2^{-8}+2^{-13}+2^{-6}+2^{-12}\right)$
$\approx\boxed{-7.5723872\times10^{-11}}$

$f'' = 12x + 10$

$f' = 6x^2 + 10x$

(3) $f(x) = 2x^3 + 5x^2 - 10$

taylor series, $x = 2$ Point of expansion

$f(2+h) = ?$, Verify by plugging in $x = 2+h$ into $f(x)$

$$f(P) = f(2) + (P-2)f'(2) + \frac{(P-2)^2}{2} f''(2)$$

$$\boxed{f(P) = 26 + (P-2)(44) + \frac{(P-2)^2}{2}(34)}$$

$f(P=2) = 26$

$f(x=2) = 26$

(5) fixed part of

$$g(x) = \frac{\sqrt{5+2x^3}}{3}, \text{ on } [-1,1], \text{ ToL} = 0.0001$$

$$f(x) = g(x) - x = \frac{\sqrt{5+2x^3}}{3} - x$$

Bisection Method $(f(x), -1, 1)$, $p = 0.0$

BM $(f, 0, 1)$, $p = 0.5$

BM $(f, 0.5, 1)$, $p = 0.75$

BM $(f, 0.75, 1)$, $p = 0.875$

BM $(f, 0.75, 0.875)$, $p = 0.8125$

BM $(f, 0.8125, 0.875)$, $p = 0.84375$

BM $(f, 0.8125, 0.84375)$, $p = 0.828125$

BM $(f, 0.8125, 0.828125)$, $p = 0.820313$

BM $(f, 0.820313, 0.828125)$, $p = 0.824214$

BM $(f, 0.824214, 0.828125)$, $p = 0.826172$

BM $(f, 0.824219, 0.826172)$, $p = 0.825195$

BM $(f, 0.824214, 0.825195)$, $p = 0.824707$

$$\boxed{0.824707}$$