Q1:

$n=11$

$$0.d_1d_2\cdots d_n = \frac{443}{2048} = \frac{443}{2^{11}}$$

$$= \boxed{\frac{2^8+2^7+2^5+2^4+2^3+2^1+2^0}{2^{11}}}$$ Burası aklımızda.

$443 = 256+128+32+16+8+2+1$

$$\begin{array}{r} {}^{1}256 \\ +128 \\ \hline 384 \end{array}$$

393

$$\begin{array}{r} 256 \\ 264 \\ \hline 128 \\ 19 \\ 3443 \\ 384 \\ - \\ \hline 59 \end{array}$$

$$\begin{array}{r} 59 \\ 32 \\ \hline 27 \end{array}$$

$27-24=3$

$\boxed{0.00110111011}$

$$\frac{443}{2048} = 2^{-3}+2^{-4}+2^{-6}+2^{-7}+2^{-8}+2^{-10}+2^{-11}$$

$= 0.00110\ 1\ 1\ 1\ 0\ 1\ 1$

0 1 2 3 4 5 6 7 8 9 10 11

|11|

The Solution

$\frac{443}{2048} \rightarrow 0.00110111011$

$1621 \rightarrow 11001010101$

0

$2\overline{)1} - 0 = 1$

$2\overline{)3} - 2 = 1$ → These will give us the answer.

$2\overline{)6} - 6 = 0$

$2\overline{)12} - 12 = 0$

$2\overline{)25} - 24 = 1$

$2\overline{)50} - 50 = 0$

$2\overline{)101} - 100 = 1$

$2\overline{)202} - 202 = 0$

$2\overline{)405} - 404 = 1$

$2\overline{)810} - 810 = 0$

$2\overline{)1621}$

$\underline{1620}$

1

Q3:

$$f(x) \cong f(a) + \frac{f'(a)}{1!}(x-a) + \dots + \frac{f^{(n)}(a)}{n!}(x-a)^{n!}.$$

$$R_n(x) = \frac{f^{(n+1)}(c)}{(n+1)!}(x-a)^{n+1} \leq \underbrace{\frac{\max(f^{(n+1)}(c))}{(n+1)!}}(x-a)^{n+1}$$

$$\boxed{a \leq c \leq x}$$

Error Rn bounded from above.

Our mission is to approximate $17^{1/3}$. $a=27$ dedik

$f(x) = x^{1/3}$

$f^{(1)}(x) = \frac{1}{3}x^{-2/3}$

$f^{(2)}(x) = \frac{-2}{9}x^{-5/3}$

$f^{(3)}(x) = \frac{10}{27}x^{-8/3}$

$$f(x) \cong f(27) + \frac{f^{(1)}(27)}{1!}(x-27) + \frac{f^{(2)}(27)}{2!}(x-27)^2$$

Elimizde boyle bir approximation var. Daha da detaylandiralim.

$$x^{1/3} \approx 3 + \frac{x-27}{3^3} - \frac{(x-27)^2}{3^7}$$

$$17^{1/3} \approx 3 + \frac{-10}{3^3} - \frac{100}{3^7}$$

$17 \le c \le 27$

$x = 17$
$a = 27$

$$|R_2| \le \left| \frac{\max(f^{(3)}(c))}{3!} (x-27)^3 \right| \Rightarrow \frac{10}{27} \frac{1}{6} (-10)^3 \max(c^{-8/3})$$

$$= -\underbrace{\frac{5000}{81} \max(c^{-8/3})}_{\text{c olabildiğince küçük olmalı.}}$$

o zaman

$$\boxed{\begin{array}{l} 2.58339048 \approx 17^{1/3} \\ \pm 0.032306 \approx \text{error} \end{array}}$$

The answer!!! ... $|R_2| \le \left| \frac{-5000}{81} 17^{-8/3} \right|$