1) $\pm 0.\underbrace{\text{mantissa}}_{3} \times 4^{E}$, $\quad E \in \{-3, \dots, 4\}$ $\quad 0.abc \times 4^{E}$

a) $(0.333)_4 \times 4^4 = 3 \times \left(\frac{1}{4} + \frac{1}{16} + \frac{1}{64}\right) \times 4^4$

$(0.001)_4 \times 4^{-3} = \frac{1}{64} \times 4^{-3} = 4^{-6}$.

b) 74 $\quad (d_2 d_1 d_0)_4 \quad$ 1, 4, 16, 64, —

$$\begin{array}{r} 74 \\ 64 \\ \hline 10 \\ -\ 8 = 2.4 \\ \hline 2 \end{array}$$

$d_0 \times 4^0$

$d_1 \times 4^1$

$d_2 \times 4^2$

2

$74 = 64 + 2.4 + 2.1 = 1 \times 4^3 + 2 \times 4^1 + 2 \times 4^0 = (1022)_4$

$$\begin{array}{l} 74 \,|\, 4 \\ 34 \quad 18 \,|\, 4 \\ 2 \quad\; 2 \quad 4 \,|\, 4 \\ 0 \qquad\quad 0 \quad 1 \,|\, 4 \\ \qquad\qquad\quad 1 \quad \cancel{0} \end{array}$$

$(\underbrace{10\,22}_{\shortparallel})_4$

$0.abc \times 4^{E}$

$0.102\cancel{2} \times 4^4$

$(0.102)_4 \times 4^4 = 72$

c) $4.625 = 4 + \underbrace{0.625}_{2.5} \quad \times 4 \qquad \frac{1}{4} \cdot \frac{1}{16}$

$\frac{1}{4} \times (1, 1/4)$

$4 + 2 \times 4^{-1} + \underbrace{0.5}_{\times 4} \times 4^{-1}$ $\qquad 1 \times 4^1 + 2 \times 4^{-1} + 2 \times 4^{-2}$

$2 = 2 \times 4^{-2}$ $\qquad (10.22)_4$

$\frac{74}{16} = 4.625 = (1022)_4 \times 4^{-2} = (10.22)_4$

0.102×4^2

0.1 → base 2

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2) $f(x) = (\ln x - 2)^2$

x	f(x)	g(x)
7.380	1.504×10^{-6}	-3.323×10^{-4}

$f'(x) = \frac{2}{x}(\ln x - 2)$; $\quad f'(e^2) = 0$.

---

3)

1.690	1.300	0.3704		
1.960	1.400	.	-0.04571	0.01001
2.250	1.500		-	
2.560	1.600	.		

$p(x) = \left(\left(\left(\cancel{x}^{2} - 2.25\right) \times 0.01001 - 0.04571\right) \times (\cancel{x}^{2} - 1.96) + 0.3704\right) \times (\cancel{x}^{2} - 1.69) + 1.3$

$\sqrt{2} \approx 1.414$

---

4)

x	1	1.100000	1.3
f(x)	0	0.104841	0.341074
	y_0	y_1	y_2

$x = 1.2$

$y_{0,1} = \frac{(x - x_0)y_1 - (x - x_1)y_0}{x_1 - x_0} \approx 0.209682$

$y_{1,2} = 0.222957$

$y_{0,1,2} = \frac{(x - x_0)y_{1,2} - (x - x_2)y_{0,1}}{x_2 - x_0} \approx 0.218532$

b) $E^{(x)} = \frac{f'''(\mu)}{3!}(x-1)(x-1.1)(x-1.3)$

$f(x) = x \ln x$

$f'(x) = \ln x + 1$

$f''(x) = 1/x$

$f'''(x) = -1/x^2$

$|E(1.2)| = \frac{|(1.2-1)(1.2-1.1)(1.2-1.3)|}{6} \times |f'''(\mu)|$

$\leq \frac{0.002}{6} \times \max_{x \in [1, 1.3]} \frac{1}{x^2} = \frac{0.002}{6} \approx 0.000333$

$<$

$E(1.2) = 1.2 \times \ln 1.2 - 0.218532 \approx 0.000254$

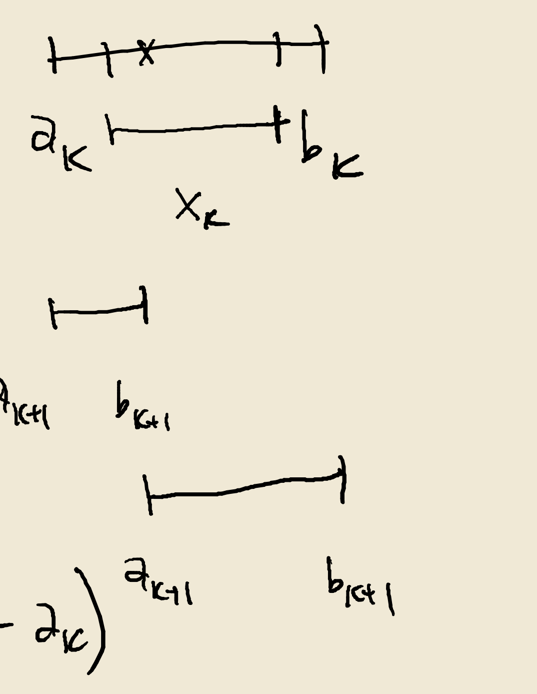
---

5) $[a_0, b_0]$, $\quad f(a_0) f(b_0) < 0$

Igual a biss, exceto que

$\sigma_k = 0.1 \times (b_k - a_k)$

$x_k \in [a_k + \sigma_k, b_k - \sigma_k]$



Na pior hipótese: 90%

$|b_{k+1} - a_{k+1}| \leq 0.9\,|b_k - a_k|$

$b_{k+1} - x_k \leq b_k - a_k - \sigma_k = 0.9(b_k - a_k)$

Daí, $\quad a_0 \leq a_k \leq x_k \leq b_k \leq b_0$

$a_k \to \bar{a}, \quad b_k \to \bar{b}$

$b_k - a_k = 0.9^k (b_0 - a_0) \to 0$

$\hookrightarrow \bar{b} - \bar{a} \Rightarrow \boxed{\bar{b} = \bar{a}}$ $\quad \Rightarrow x_k \to \bar{a} = \bar{b}$

$f(a_k) f(b_k) < 0 \Rightarrow f(\bar{a}) f(\bar{b}) \leq 0$

$f(\bar{x})^2 \leq 0 \Rightarrow \boxed{f(\bar{x}) = 0}$.

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6) $\int_0^3 e^{-x^2} dx \qquad h = 0.5$

$\approx \frac{0.5}{3}\left[f(0) + 4 \times (f(0.5) + f(1.5) + f(2.5)) + 2 \times (f(1) + f(2)) + f(3)\right]$

≈ 0.8862