$f(x)=\ln x - 2, \quad [6,8], \quad |f(x)|<10^{-2}$

$7, \; 7.5, \; 7.25, \; 7.375$

$f(x) = (\ln x - 2)^2 \qquad 7.38$

$$S = \sum_{k=0}^{\infty} \underbrace{\frac{5^k (k!)^3}{(3k)!}}_{t_k} \qquad t_{k-1} = \frac{5^{k-1}((k-1)!)^3}{(3(k-1))!} = \frac{5^{k-1}((k-1)!)^3}{(3k-3)!}$$

$$\frac{t_k}{t_{k-1}} = \frac{5\,k^{\cancel{3}\,2}}{\cancel{3k}\,(3k-1)(3k-2)} = \frac{5k^2}{3(3k-1)(3k-2)}$$

```
s ← 0.0
t ← 1.0
k ← 1
while s+t ≠ s      1        3*2*1
    s ← s+t
    t ← t * 5 * k^2/(3*(3k-1)*(3k-2))
ord.  k ← k+1
end
return S
```

$x \in \mathbb{N}, \; b \in \mathbb{N}, \; b>1$

```
V ← []
while x ≠ 0
    r = x % b
    Guarde r em V
    x = ⌊x/b⌋
end
```

$7 \% 3 = 1$ $7 \mid 3$, $-6 \;\; 2$, 1 $= x\%b$

V	x	r
[]	7	1
[1]	2	2
$\boxed{[2,1]}$	0	FIM

$293 \mid 4$; 13, $73 \mid 4$; 1, 33, $18 \mid 4$; 1, 2, $4 \mid 4$; 0, $1 \mid 4$; 1, 0

V	x	r
[]	293	1
[1]	73	1
[1,1]	18	2
[2,1,1]	4	0
[0,2,1,1]	1	1
[1,0,2,1,1]	0	FIM

b) i) $0 \le x < b$ $x=0$ FIM $[\,]$

$x \neq 0$

$r = x \% b = x$ $[x]$

$x = \lfloor x/b \rfloor = 0$

ii) $x = b^k$ $k=0, \; x=1, \; V=[1]$

$k>0$, $r = b^k \% b = 0$ $V=[0]$

$x = \lfloor b^k/b \rfloor = b^{k-1}$

$\underbrace{[1,0,\dots,0]}_{k}$

c) $V = [v_1,\dots,v_k]$ x

$bx, \; b$ 1ª $r = bx \% b = 0$

$x = \lfloor bx/b \rfloor = x$

$[0]$

$[v_1,\dots,v_k,0]$

---

5) $$\int_1^2 \ln x \, dx \approx \frac{h}{2}\left[\ln x_0 + 2\sum_{i=1}^{n-1} \ln x_i + \ln x_n\right]$$

$$\approx \frac{0.2}{2}\left[\ln 1 + 2\times(\ln 1.2 + \dots + \ln 1.8) + \ln 2\right]$$

$$\approx \frac{0.2}{2} \times 3.8463 \approx 0.3846$$

$E = 0.3863 - 0.3846 = 0.0017$

b) $E = -\dfrac{h^2(b-a)}{12} f''(\mu)$, $n? \Rightarrow |E| < 10^{-4}$

$f''(x) = \dfrac{-1}{x^2}$; $|f''(\mu)| \le \max_{x\in[1,2]} \dfrac{1}{x^2} = 1.$

$|E| \le \dfrac{h^2 \cdot (2-1)}{12} \cdot 1 = \dfrac{h^2}{12} < 10^{-4} \Rightarrow h < \sqrt{12\times 10^{-4}}$

$h = \dfrac{b-a}{n} = \dfrac{1}{n} \Rightarrow n > \dfrac{1}{\sqrt{12\times10^{-4}}} \approx 28.9$

$\Rightarrow$ 29 intervalos