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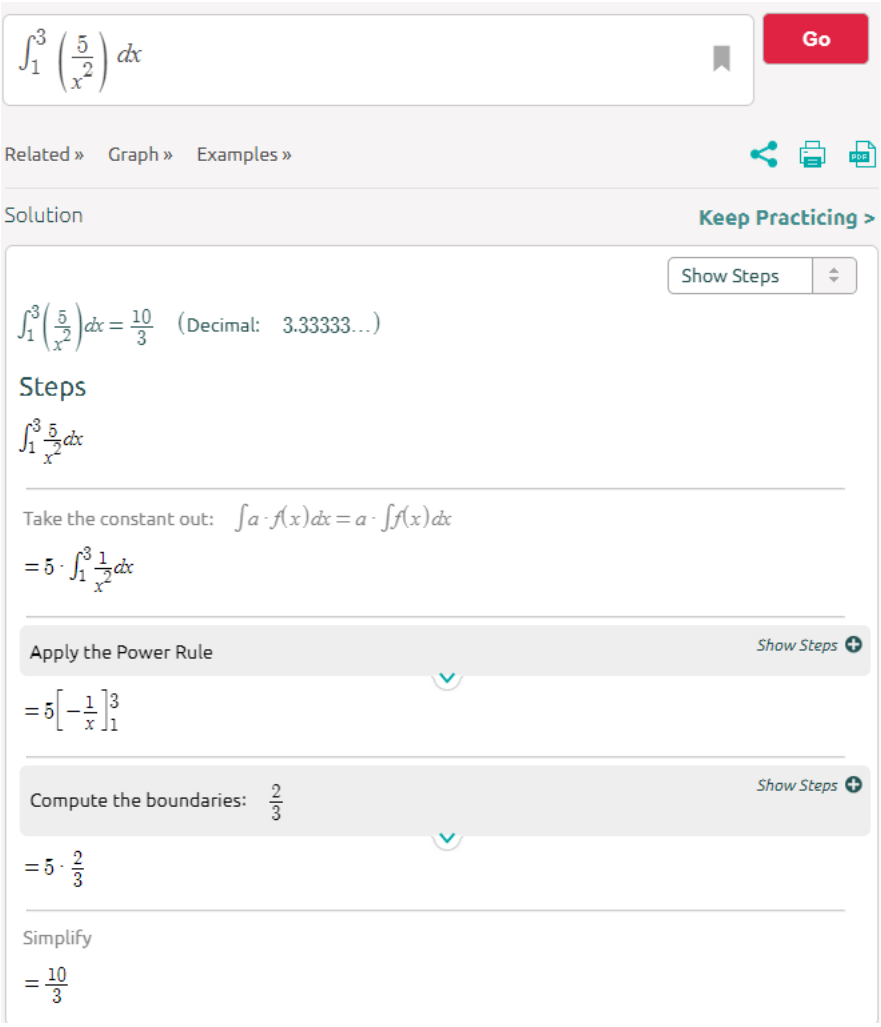
Pregunta 1 12 pts

Encuentra el valor de 'k' de tal forma que f(x) sea una función de distribución de probabilidad.

$f(x) = k \cdot \frac{5}{x^2}, 1 < x \leq 3$

- ○ 1
- ○ 3/10
- ○ 10/3
- ○ 3/7



Aquí se despeja con K

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Pregunta 2 12 pts

Given the following probability distribution function (pdf)

$$f(x)=\begin{cases}\frac{1}{75}x, & x\in[0,10)\\ \frac{2}{5}-\frac{2}{75}x, & x\in[10,15)\end{cases}$$

Choose its corresponding cumulative distribution function (CDF)

$$\mathcal{F}1(x)=\begin{cases}0, & x\in(-\infty,0)\\ \frac{1}{150}x^2, & x\in[0,10)\\ -\frac{1}{75}x^2+\frac{2}{5}x+2, & x\in[10,15)\\ 1, & x\in[15,\infty)\end{cases}$$

$$\mathcal{F}3(x)=\begin{cases}0, & x\in(-\infty,0)\\ \frac{1}{150}x^2+1, & x\in[0,10)\\ -\frac{1}{75}x^2+\frac{2}{5}x, & x\in[10,15)\\ 1, & x\in[15,\infty)\end{cases}$$

$$\mathcal{F}2(x)=\begin{cases}0, & x\in(-\infty,0)\\ \frac{1}{150}x^2, & x\in[0,10)\\ -\frac{1}{75}x^2+\frac{2}{5}x-2, & x\in[10,15)\\ 1, & x\in[15,\infty)\end{cases}$$

$$\mathcal{F}4(x)=\begin{cases}0, & x\in(-\infty,0)\\ \frac{1}{150}x^2-1, & x\in[0,10)\\ -\frac{1}{75}x^2+\frac{2}{5}x, & x\in[10,15)\\ 1, & x\in[15,\infty)\end{cases}$$

WolframAlpha inteligencia computacional

$$\int_0^x \frac{1}{75}x\,dx$$

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POPULAR

Integral definida

$$\int_0^x \frac{x}{75}\,dx=\frac{x^2}{150}$$

Integral indefinida — Solución paso a paso

$$\int \frac{x}{75}\,dx=\frac{x^2}{150}+\text{constante}$$

Potenciado por WOLFRAM LANGUAGE

$$\int_{10}^x \frac{2}{5}-\frac{2}{75}x\,dx$$

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POPULAR

Integral definida

$$\int_{10}^x\left(\frac{2}{5}-\frac{2x}{75}\right)dx=-\frac{x^2}{75}+\frac{2x}{5}-\frac{8}{3}$$

Integral indefinida — Solución paso a paso

$$\int\left(\frac{2}{5}-\frac{2x}{75}\right)dx=\frac{2x}{5}-\frac{x^2}{75}+\text{constante}$$

Potenciado por WOLFRAM LANGUAGE

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Pregunta 3 12 pts

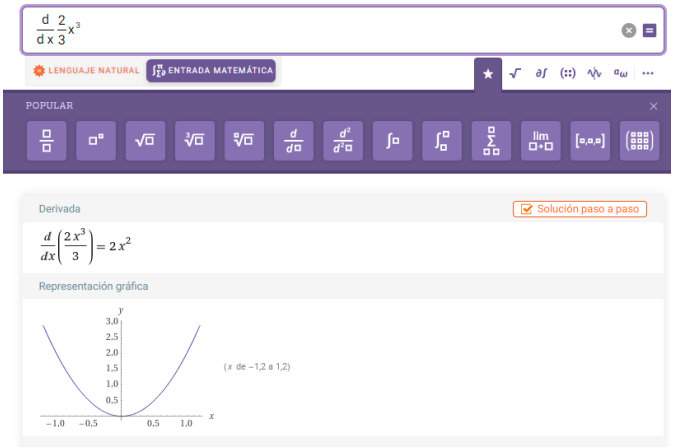
Given the following Cumulative Distribution Function (CDF)

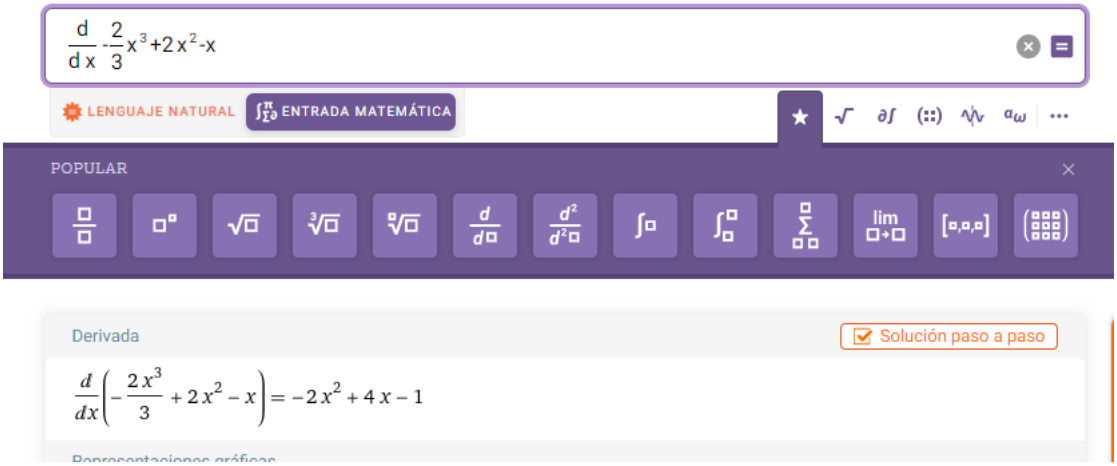
$$\mathcal{F}(x) = \begin{cases} 0, & x \in (-\infty, 0) \\ 2x^2, & x \in [0, 0.5) \\ -2x^2 + 4x - 1, & x \in [0.5, 1) \\ 1, & x \in [1, \infty) \end{cases}$$

Which one is its corresponding Probability Density Function (pdf)?

$$f_1(x) = \begin{cases} \frac{2}{3}x^3, & x \in [0, 0.5) \\ -\frac{2}{3}x^3 + 2x^2 - x, & x \in [0.5, 1) \end{cases}$$

$$f_2(x) = \begin{cases} 4x, & x \in [0, 0.5) \\ -4x + 4, & x \in [0.5, 1) \end{cases}$$





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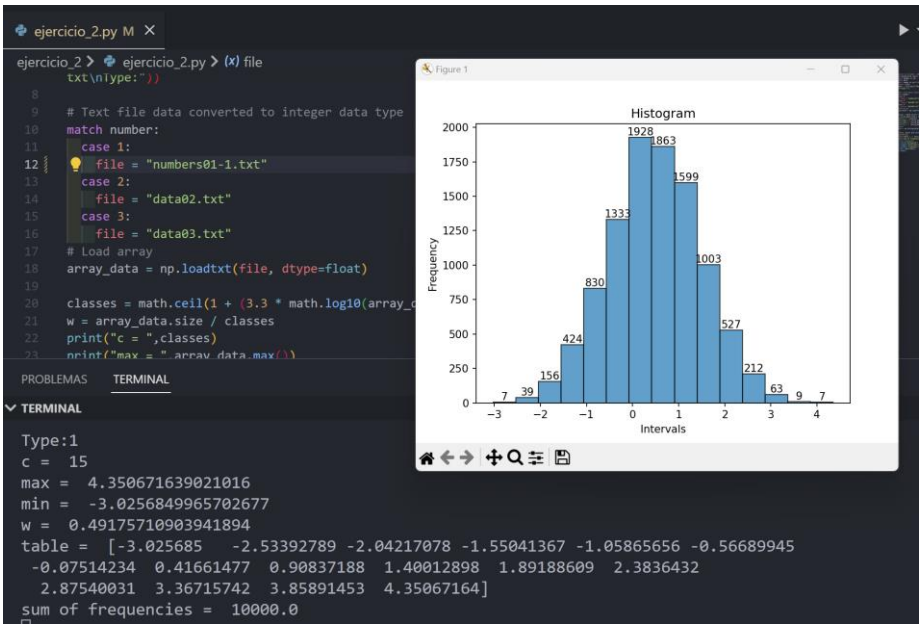
Pregunta 4 12 pts

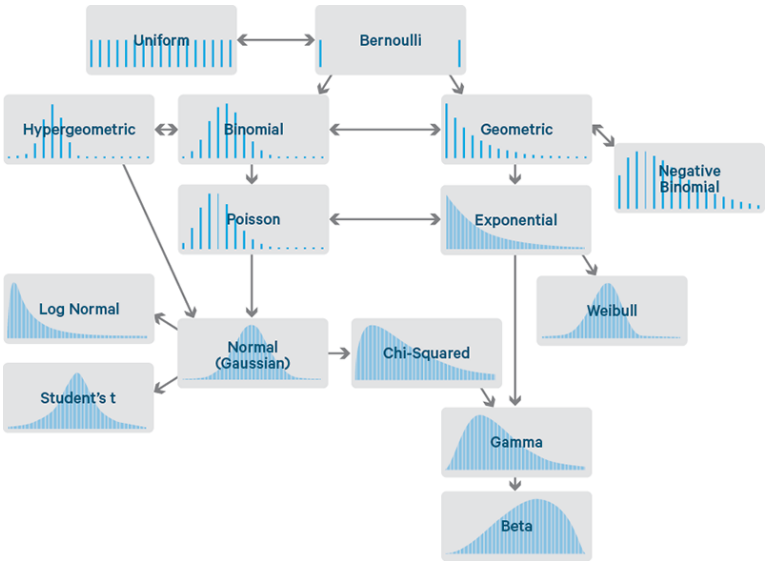
Load the following data set numbers01-1.txt

Plot the histogram, what seems to be the distribution the data set comes from?

- ○ Exponential
- ○ Uniform
- ○ Normal

Anterior Siguiente





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Pregunta 5 12 pts

Using the Linear Congruential Method, generate 1000 numbers with the following parameters: X0 = 88, a = 50, c = 2, m = 100

Use the chi-squared test (with C = 10 and W = 0.10) and choose the calculated value for χ^2

- ○ 900
- ○ 9
- ○ 90
- ◉ 9000

```python
import matplotlib.pyplot as plt

# método lineal congruencial (L.C.G.)
#Linear congruential method: Generate 1000 numbers with the following
parameters: X0 = 88, a = 50, c = 2, m = 100.
def lcg(seed):
    while True:
        seed = (50 * seed + 2) % 100)
        yield seed / 100
rand = lcg(88)
values = [next(rand) for _ in range(100)]
print(values)

with open('output.txt', 'w') as f:
    for value in values:
        f.write(format(value))
        f.write('\n')

plt.hist(values, bins=1000, edgecolor='k', color = '#0c1881', histtype = 'bar')
plt.show()
```

```
LEMAS  TERMINAL
INAL

ython lcg.py
02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02,
2, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0.02, 0
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.02, 0.02, 0.02, 0.02]
```

```python
oyecto_p1 > chi2.py > ...
    for i in range(1000):
        X0 = (a*X0 + c) % m
        numbers.append(X0/m)

    observed_counts = [0]*10
    expected_counts = [100]*10
    for number in numbers:
        interval = int(number/0.10)
        observed_counts[interval] += 1

    chi_squared = sum([((observed_counts[i]-expected_counts[i])
                ** 2)/expected_counts[i] for i in range(10)])
    print(chi_squared)
```

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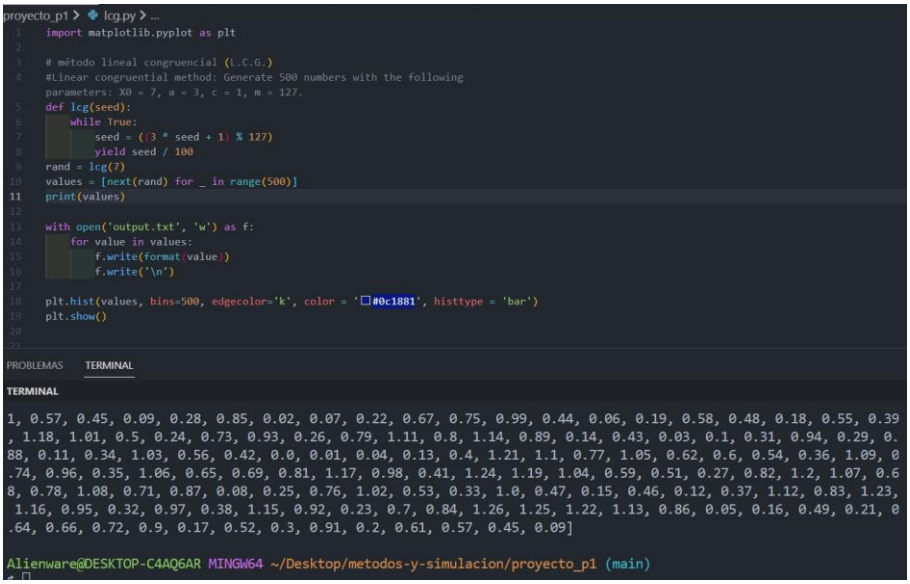
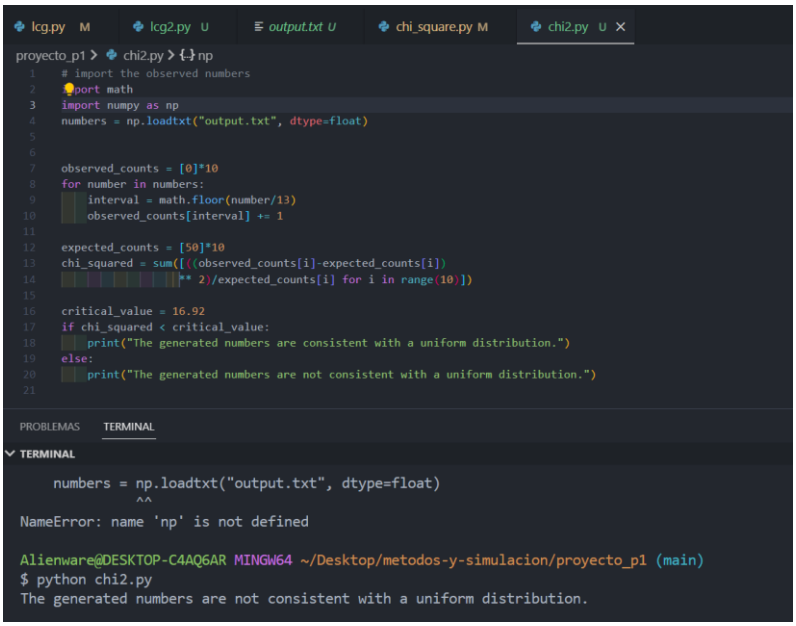
Pregunta 6 — 12 pts

Generate 500 numbers from the Linear Congruential Generator with parameters: X0 = 7, a = 3, c = 1, m = 127

Run the Chi-square test and Runs test with **α = 0.05** and choose the correct statement about the generated numbers.





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Pregunta 7 14 pts

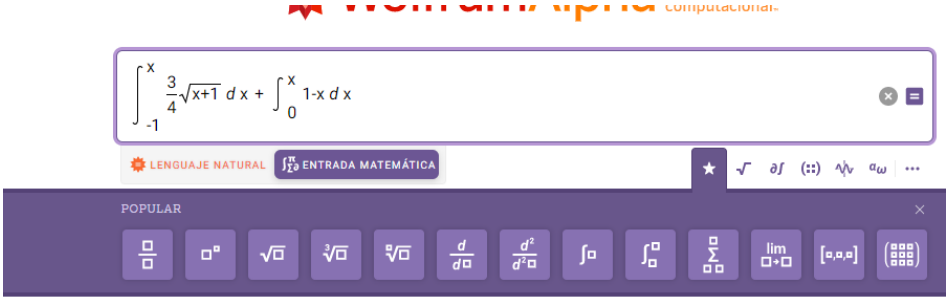
Given the following pdf:

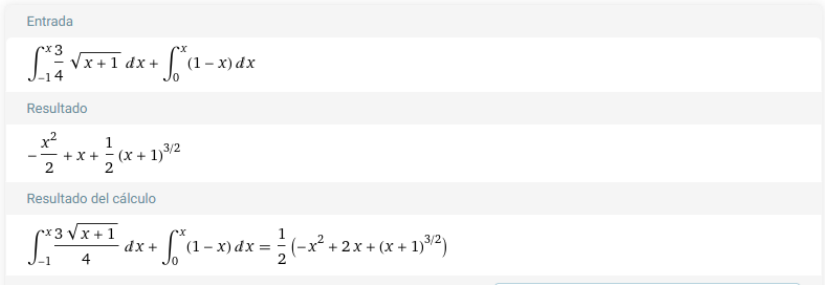
$$f(x) = \begin{cases} \frac{3}{4}\sqrt{x+1}, & x \in [-1,0) \\ 1-x, & x \in [0,1) \end{cases}$$

Use the inverse method to generate a single random number, using R = 0.97

- ○ 0.8551
- ○ 0.7551
- ○ 0.6551
- ○ 0.5551

◂ Anterior Siguiente ▸





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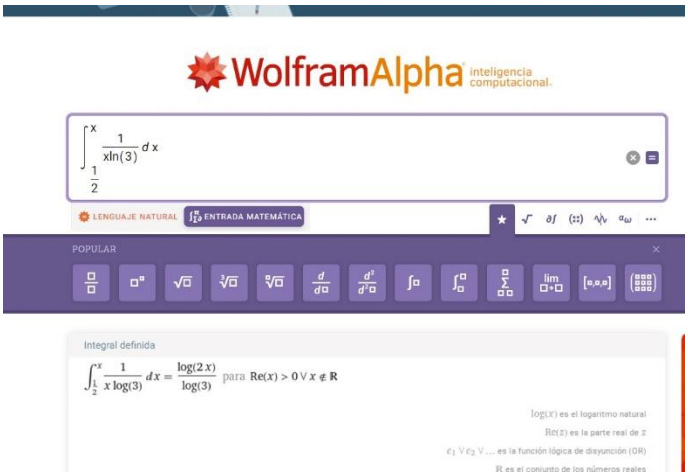
Pregunta 8 14 pts

Dada la siguiente función de distribución de probabilidad

$f(x) = \frac{1}{xln3}, \ \frac{1}{2} \leq x \leq \frac{3}{2}$

Utiliza el método de la función inversa para generar números aleatorios. Elige el valor más cercano al **valor esperado**.

- ○ 5.6879
- ○ 0.54789
- ◉ 0.9102
- ○ 14.9688



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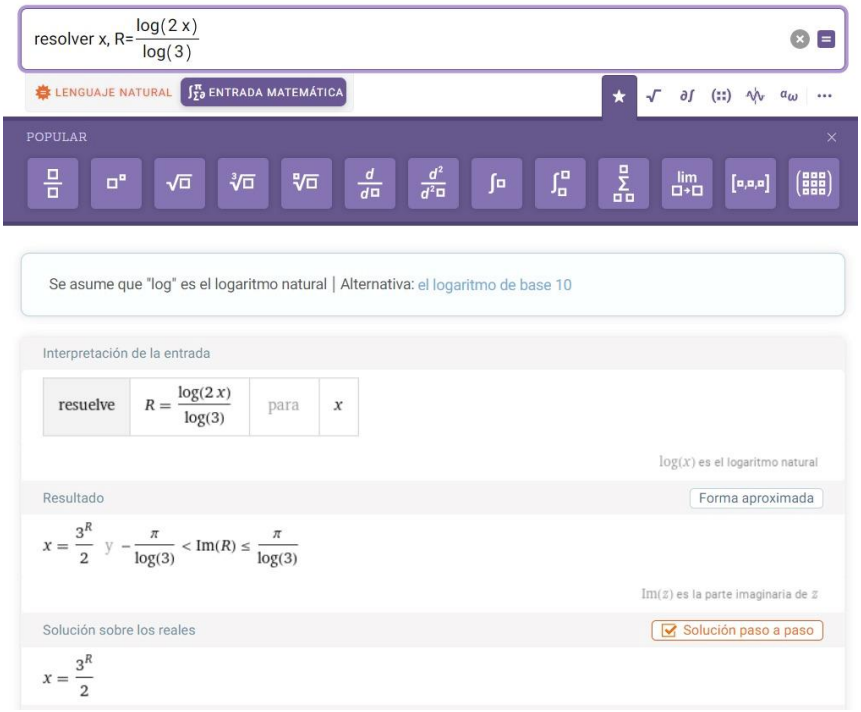

Despejar R