

# INTEGRATION BEE

## Round 2

*Mathematics Club*

CFI, IITM

September 15, 2025



Instructions

Question 0

Question 1

Question 2

Question 3

Question 4

Question 5

Question 6

Question 7

Connect to one of three networks as informed:

int\_bee\_1-1 : Row 1

int\_bee\_1-2 : Row 2

int\_bee\_2 : Row 3

int\_bee\_3 : Row 4

Then navigate to <https://intbee.mathiitm.com:5000/>

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Find the value of

$$\int_1^2 x \, dx$$



Find the value of

$$\int_0^5 (-1)^{[x] + \left\lfloor \frac{x}{\sqrt{2}} \right\rfloor + \left\lfloor \frac{x}{\sqrt{3}} \right\rfloor} dx$$



Find the value of

$$\int_0^{\frac{1}{\sqrt{3}}} \sqrt{x + \sqrt{x^2 + 1}} \, dx$$

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$$I = \int_{-1}^{\infty} \frac{(1+x)^5}{(3+x)^{10}} dx$$

Find  $I^{-1}$



If  $f(x)$  is defined in  $[0, 1]$ , such that

$$\int_0^1 (f(x))^2 dx = 4 \text{ and}$$

$$\int_0^1 f(x) dx = \int_0^1 xf(x) dx = 1. \text{ Then what is}$$

$$\int_0^1 (f(x))^3 dx$$



Find the value of

$$\int_0^{\frac{\pi}{3}} \left( \frac{\sec(x) + \tan(x)}{\csc(x) + \cot(x)} \right) (\sec(x) + \csc(x)) dx$$





Find the value of

$$\int_{-\infty}^{\infty} e^x \cdot \frac{\ln(1 + e^{-x})}{(e^x + 1)(\sqrt{2e^x + 1})} dx$$



Let  $I_n = \int_0^\pi \cos^n x dx$ . Evaluate

$$\sum_{n=0}^{\infty} \frac{I_n}{2^n}$$

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