

# Integration Bee Qualifiers November 2019 HMMT

Time Limit: 20 minutes

*All logarithms are base  $e$*

*You may omit the constant of integration*

*The integrals are ordered in terms of approximate difficulty*

*All integrals are worth equal points*

*Ties will be broken by the highest-numbered integral solved*

1.

$$\int_{-1}^1 \sin(x) dx$$

2.

$$\int (x + e^x)^2 dx$$

3.

$$\int e^{e^x + x + 1} dx$$

4.

$$\int (x \tan x + 2)(x \sec x) dx$$

5.

$$\int \frac{\cos x}{\sin x \log(\sin x) \log(\log \sin x)} dx$$

6.

$$\int \sin \log x dx$$

7.

$$\int_0^1 \frac{1}{\sqrt{x - x^2}} dx$$

8.

$$\int_0^{2\pi} \frac{\sin(3x)}{\sin(x)} dx$$

9.

$$\int \frac{\cos x - \sin x}{\sqrt{\sin 2x}} dx$$

10.

$$\int_0^{\pi/2} \log \tan x dx$$

11.

$$\int_0^1 \sqrt{\frac{1+x}{1-x}} dx$$