COLLEGE ROUND ONE

You will have **two minutes** to evaluate each of the fifteen definite integrals that will displayed one at a time on this screen. **All answers must be simplified.** At the end of the two minutes, all hands must go up and judges will grade your answers immediately. For each correct answer, you will receive one ra e ticket to be entered for prizes that will be drawn after dinner.

At most five participants will move to the finals—to be determined by the total number of correct answers and tiebreaking criteria if necessary. **Everyone moving to the finals will receive $25.**

INTEGRAL #1

READY,

GET SET,...

2:00

INTEGRAL #1

$$\int_0^1 (3 \quad +4)(5 \quad + \quad)$$

2:00

INTEGRAL #1

$$\int_0^1 (3 \quad +4)(5 \quad + \quad)$$

$$= \int_0^1 (15 \ ^2 + 3 \quad + 24)$$

$$= \left[5 \ ^3 + 19 \ ^2 + 24 \right]_0^1$$

$$= \square$$

INTEGRAL #2

READY,

GET SET,...

2:00

INTEGRAL #2

$$\int_0^1 \frac{2011}{2012+1}$$

2:00

INTEGRAL #2

$$\int_0^1 \frac{2011}{2012+1}$$

$$= \frac{1}{2012}\int_1^2 \frac{1}{-} \qquad \begin{matrix} h \\ = \end{matrix} \quad {}^{2012}+1 \qquad = 2012^{\,2011} \qquad \begin{matrix} i \end{matrix}$$

$$= \frac{1}{2012}\ln \Big|_1^2$$

$$= \frac{\qquad}{\qquad}$$

INTEGRAL #3

READY,

GET SET,...

2:00

INTEGRAL #3

$$\int_0^{\pi/2} \cos$$

2:00

INTEGRAL #4

READY,

GET SET,...

2:00

INTEGRAL #4

$$\int_0^1 \frac{\quad + \quad + 1}{(\quad + 1)}$$

2:00

INTEGRAL #4

$$\int_0^1 \frac{+\quad+1}{(\quad+1)}$$

$$= \int_0^1 \left(\frac{}{(\quad+1)} + \frac{+1}{(\quad+1)} \right) \qquad = \int_0^1 \left(\frac{1}{+1} + \frac{1}{-} \right)$$

$$= \int_0^1 \left(\frac{1}{+1} + \quad - \right) \qquad = \quad \ln(\quad+1) - \quad - \Big|_0^1$$

$$= \boxed{\ln 2 - \quad ^{-1} + 1 \quad \text{or} \quad \ln 2 - \frac{1}{-} + 1}$$

READY,

GET SET,...

2:00

INTEGRAL #5

$$\int_0^{\pi/4} \sec^4$$

2:00

INTEGRAL #5

$$\int_0^{\pi/4} \sec^4$$

$$= \int_0^{\pi/4} \sec^2 \cdot \sec^2 \qquad = \int_0^{\pi/4} (\tan^2 + 1) \sec^2$$

$$= \int_0^1 ({}^2 + 1) \qquad \text{h} \qquad = \tan \qquad = \sec^2 \qquad \text{i}$$

$$= \left[\frac{{}^3}{3} + \right]_0^1 = \boxed{\frac{4}{3}}$$

INTEGRAL #6

READY,

GET SET,...

2:00

INTEGRAL #6

$$\int_0^1 \sqrt{4^2+1}$$

2:00

INTEGRAL #7

READY,

GET SET,...

2:00

2:00

INTEGRAL #8

READY,

GET SET,...

2:00

INTEGRAL #8

$$\int_{1}^{\sqrt{3}} \quad p \_\_\_\_$$

2:00

INTEGRAL #8

$$\int_1^{\sqrt{3}} \frac{p}{-1} \frac{p}{+1}$$

$$= \int_1^{\sqrt{3}} \frac{p}{^2 - 1}$$

$$= \frac{1}{2} \int_0^2 \sqrt{\quad} \qquad h \qquad = {}^2 - 1 \qquad = 2$$

$$=$$

INTEGRAL #9

READY,

GET SET,...

2:00

INTEGRAL #9

$$\int_{2}^{3}$$

2:00

INTEGRAL #9

$$\int_2^3 \frac{3}{^2 + \quad - 2}$$

$$= \int_2^3 \frac{3}{(\quad)(1)(\quad + 2)} \quad = \int_2^3 (\quad 1$$

1 2 0 3 0 2 3 3 2 0 5 2

INTEGRAL #10

READY,

GET SET,...

2:00

INTEGRAL #10

$$\int_1^2 \frac{\sec\sqrt{\ } \tan\sqrt{\ }}{\sqrt{\ }}$$

2:00

INTEGRAL #10

$$\int_1^2 \frac{\sec\sqrt{\ }\tan\sqrt{\ }}{\sqrt{\ }}$$

$$= 2\int_1^{\sqrt{2}} \sec \quad \tan$$

$$= 2 \quad \sec \quad \Big|_1^{\sqrt{2}}$$

$$\text{nbn} = \boxed{2\,\text{R}\,\sec\sqrt{2} - \sec 1}$$

[$= \sqrt{\ }$ $= \frac{1}{2\sqrt{\ }}$]

sec

INTEGRAL #11

READY,

GET SET,...

2:00

INTEGRAL #11

$$\int_{1}^{\sqrt{3}} \frac{2}{2\sqrt{1-\frac{2}{2}}}$$

2:00

INTEGRAL #12

$$\int_0^{\ln \sqrt{3}} \frac{1}{\quad}$$

2:00

INTEGRAL #12

$$\int_0^{\ln\sqrt{3}} \frac{1}{+\frac{1}{}}$$

$$= \int_0^{\ln\sqrt{3}} \frac{1}{+\frac{1}{}} \cdot - \qquad = \int_0^{\ln\sqrt{3}} \frac{}{^2+1}$$

$$= \int_1^{\sqrt{3}} \frac{1}{^2+1} \qquad \text{h} \qquad = \qquad = \qquad \text{i}$$

$$= \text{h} \quad \text{arctan} \quad \text{i}_1^{\sqrt{3}} = \boxed{\frac{\pi}{3} - \frac{\pi}{4} \quad \text{or} \quad \frac{\pi}{12}}$$

INTEGRAL #13

READY,

GET SET,...

2:00

INTEGRAL #13

$$\int_0^{\pi/4} \frac{\mathrm{p}}{1+\cos 2}$$

2:00

INTEGRAL #13

$$\int_0^{\pi/4} \sqrt{\frac{}{1+\cos 2}}$$

$$= \int_0^{\pi/4} \sqrt{2\cos^2} \qquad \left[\text{trig identity: } \cos^2 = \frac{1+\cos 2}{2}\right]$$

$$= \sqrt{2}\int_0^{\pi/4} \cos \qquad = \sqrt{2}\Big[\sin\Big]_0^{\pi/4}$$

$$= \boxed{1}$$

INTEGRAL #14

READY,

GET SET,...

2:00

INTEGRAL #14

2:00

INTEGRAL #14

$$\int_0^1 p\frac{}{3} p\frac{}{5} p - p\frac{}{9} p\frac{}{11}$$

$$= \int_0^1$$

INTEGRAL #15

READY,

GET SET,...

2:00

INTEGRAL #15

$$\int_0^2 \left(2^2 \quad ^2 + \quad ^2 \right)$$

2:00

INTEGRAL #15

$$\int_0^{2} \left(\quad 2 \quad ^2 \quad ^2 + \quad ^2 \right)$$

"

integrate by parts = = 2 ^{2} #

the first term only = = ^{2}

$$= \quad {}_2 \left| {}_0^2 - \int_0^2 \quad ^2 + \int_0^2 \quad ^2 \right.$$

$$= \quad {}_2 \left| {}_0^2 = \boxed{2 \quad ^4} \right.$$

THANKS FOR PLAYING

LET'S EAT!

(YOU HAVE TWO MINUTES TO FINISH YOUR FOOD)

THE FINAL ROUND BEGINS AFTER DINNER