

# HIGH SCHOOL ROUND ONE

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You will have

**INTEGRAL #1**

**READY,  
GET SET,...**

**2:00**

**INTEGRAL #1**

$$\int_0^1 2012^{2012}$$

## INTEGRAL #1

$$\int_0^1 2012 x^{2012} dx$$

$$= \left[ 2012 \cdot \frac{x^{2013}}{2013} \right]_0^1$$

$$= \frac{2012}{2013}$$

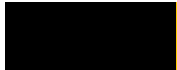
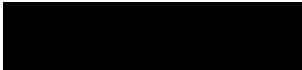
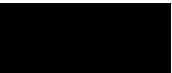
**INTEGRAL #2**

**READY,  
GET SET,...**

**2:00**



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## INTEGRAL #2

$$\int_0^2 \cos \frac{\pi}{2} x$$

$$= \frac{1}{\pi} \int_0^{\pi} \cos x \quad \left[ \begin{array}{l} = \frac{\pi}{2} \\ = \frac{\pi}{2} \end{array} \right]$$

$$= \frac{1}{\pi} \left[ \sin x \right]_0^{\pi} = \frac{1}{\pi} \left( \frac{\sqrt{2}}{2} - 0 \right)$$

$$= \frac{\sqrt{2}}{\pi}$$

**INTEGRAL #3**

**READY,  
GET SET,...**

**2:00**

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## INTEGRAL #3

$$\int_0^1 (\sqrt{x} + 1)(x + 1) dx$$

## INTEGRAL #3

$$\int_0^1 (\sqrt{x} + 1)(\sqrt{x} + 1)$$

**INTEGRAL #4**

**READY,  
GET SET,...**

**2:00**

## INTEGRAL #4

$$\int_0^{\sqrt{\pi/2}} \sin(x^2) dx$$



## INTEGRAL #4

$$\int_0^{\sqrt{\pi^2}} \sin(x^2)$$

$$= \frac{1}{2} \int_0^{\pi^2} \sin(x) \quad \left[ \begin{array}{l} = x^2 \\ = 2 \end{array} \right]$$

$$= \frac{1}{2} \left[ -\cos(x) \right]_0^{\pi^2}$$

$$= \frac{1}{2}$$

**INTEGRAL #5**

**READY,  
GET SET,...**

**2:00**

**INTEGRAL #5**

$$\int_1^2 \frac{+}{\cdot 2}$$





**INTEGRAL #6**

**READY,  
GET SET,...**

**2:00**

## INTEGRAL #6

$$\int_{\pi}^{\pi/2} \frac{\cos}{1 - \cos^2}$$

## INTEGRAL #6

$$\int_{\pi}^{\pi/2} \frac{\cos}{1 - \cos^2}$$

$$= \int_{\pi}^{\pi/2} \frac{\cos}{\sin^2}$$

$$= \int_{1/2}^1 \frac{1}{2} \quad \left[ \begin{array}{l} = \sin \\ = \cos \end{array} \right]$$

$$= \left[ -\frac{1}{\sin} \right]_{1/2}^1 = 1$$

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**INTEGRAL #7**

**READY,  
GET SET,...**

**2:00**

**INTEGRAL #7**

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

**INTEGRAL #7**

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

$$= \int_0^1 (\quad + \quad)$$

$$= \left[ \quad + \quad \right]_0^1$$

$$= \boxed{1}$$

**INTEGRAL #8**

**READY,  
GET SET,...**

**2:00**



# **INTEGRAL #8**





**INTEGRAL #8**

$$\int_{\pi}^{\pi} \sec (\tan - \sec )$$

$$= \int_{\pi}^{\pi} (\sec \tan - \sec^2 )$$

$$= \left[ \sec - \tan \right]_{\pi}^{\pi}$$

$$= (2 - \sqrt{\phantom{x}}) - (\sqrt{2} - 1) = \boxed{-\sqrt{\phantom{x}} - \sqrt{2}}$$

**INTEGRAL #9**

**READY,  
GET SET,...**

**2:00**

**INTEGRAL #9**

$$\int_0^1 \sqrt{x} (\sqrt{x} + 1)$$

**INTEGRAL #9**

$$\int_0^1 \sqrt{x} (\sqrt{x} + 1)$$

$$= \frac{2}{3} \int_1^2 \left[ \sqrt{x} + 1 \right] dx$$

$$= \frac{2}{3} \left[ \frac{2}{3} \right]_1^2$$

$$= \frac{5}{2}$$

**INTEGRAL #10**

**READY,  
GET SET,...**

**2:00**

**INTEGRAL #10**

$$\int_1 \left( + \frac{1}{-} \right)^2$$



**INTEGRAL #11**

**READY,  
GET SET,...**

**2:00**



**INTEGRAL #11**

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





**INTEGRAL #12**

$$\int_{-}^1 ( + ) \sqrt{ + }$$

**INTEGRAL #12**

$$\int_{-}^1 ( + ) \sqrt{ + }$$

$$= \int_{-}^1 ( + )^2$$

$$= \int_0^2 \left[ = + = \right]$$

$$= \left[ \frac{2 \sqrt{2}}{\sqrt{2}} \right]_0 = \frac{\sqrt{2}}{\sqrt{2}}$$

**INTEGRAL #13**

**READY,  
GET SET,...**

**2:00**

## INTEGRAL #13

$$\int_0^{\pi} (\cos - \sin)$$

**INTEGRAL #13**

$$\begin{aligned} & \int_0^{\pi} (\cos^2 - \sin^2) \\ &= \int_0^{\pi} (\cos^2 + \sin^2) (\cos^2 - \sin^2) \\ &= \int_0^{\pi} 1 \cdot (\cos^2 - \sin^2) = \int_0^{\pi} \cos 2 \\ &= \left[ \frac{\sin 2}{2} \right]_0^{\pi} = \frac{\sqrt{\quad}}{\quad} \end{aligned}$$



**INTEGRAL #14**

**READY,  
GET SET,...**

**2:00**



**INTEGRAL #14**

$$\int_0^1 2x^2 \cdot \sqrt{x} \, dx$$

$$= \int_0^1 120x^1 \, dx$$

$$= \left[ 120 \cdot \frac{x^2}{2} \right]_0^1 = \left[ 60x^2 \right]_0^1$$

$$= \boxed{60}$$

**INTEGRAL #15**

**READY,  
GET SET,...**

**2:00**



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**INTEGRAL #15**

$$\int_0^1 \sqrt{\quad} \quad 10 \quad 000000010 \quad 010 \quad 010 \quad 010 \quad 0100001$$

**THANKS FOR PLAYING**

**LET'S EAT!**

**(YOU HAVE TWO MINUTES TO FINISH YOUR FOOD)**

**THE FINAL ROUND BEGINS AFTER DINNER**