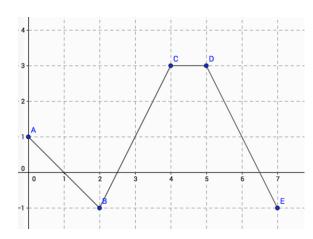
#1 Calculus – Hustle National MAO Convention 2022

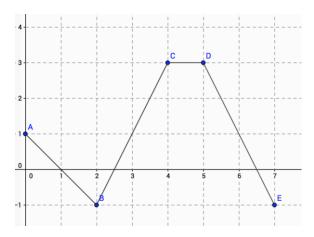


Find the sum of all x values for the graph of y in the interval (0, 7) where the graph is not differentiable.

Answer : _____

Round 1 2 3 4 5

#1 Calculus – Hustle National MAO Convention 2022

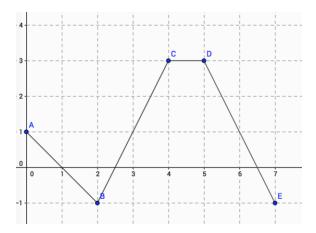


Find the sum of all x values for the graph of y in the interval (0, 7) where the graph is not differentiable.

Answer : _____

Round 1 2 3 4 5

#1 Calculus – Hustle National MAO Convention 2022

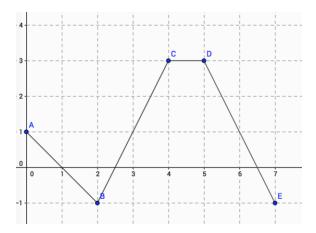


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Round 1 2 3 4 5

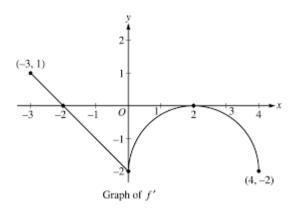
#1 Calculus – Hustle National MAO Convention 2022



Find the sum of all x values for the graph of y in the interval (0, 7) where the graph is not differentiable.

Answer : _____

#2 Calculus – Hustle National MAO Convention 2022

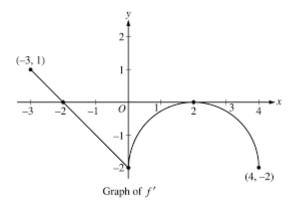


Give the x value where a relative minimum exists on the graph of f(x). If there is no solution, write "none".

Answer:

Round 1 2 3 4 5

#2 Calculus – Hustle National MAO Convention 2022

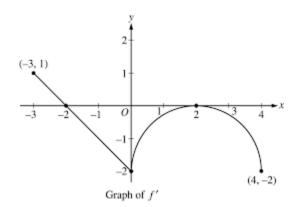


Give the x value where a relative minimum exists on the graph of f(x). If there is no solution, write "none".

Answer : _____

Round 1 2 3 4 5

#2 Calculus – Hustle National MAO Convention 2022

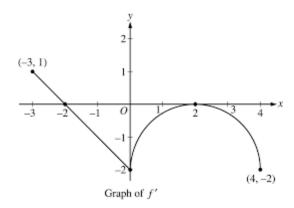


Give the x value where a relative minimum exists on the graph of f(x). If there is no solution, write "none".

Answer : _____

Round 1 2 3 4 5

#2 Calculus – Hustle National MAO Convention 2022



Give the x value where a relative minimum exists on the graph of f(x). If there is no solution, write "none".

Answer : _____

$$\int \frac{x+2}{x^2+8x+12} dx$$

$$\int \frac{x+2}{x^2+8x+12} dx$$

Answer : _____

Answer : _____

Round 1 2 3 4 5

Round 1 2 3 4 5

#3 Calculus – Hustle National MAO Convention 2022

$$\int \frac{x+2}{x^2+8x+12} \, dx$$

$$\int \frac{x+2}{x^2+8x+12} dx$$

Answer : ______

Answer : _____

Round 1 2 3 4 5

#4 Calculus – Hustle National MAO Convention 2022

$$g(x) = \begin{cases} -x, & x < -2\\ \frac{1}{2}x^2 - 1, & -2 \le x < 2\\ -x + 3, & x > 2 \end{cases}$$

$$\lim_{x \to 2} g(x) + \lim_{x \to -2^+} g(x) + \lim_{x \to -2^-} g(x)$$

#4 Calculus – Hustle National MAO Convention 2022

$$g(x) = \begin{cases} -x, & x < -2\\ \frac{1}{2}x^2 - 1, & -2 \le x < 2\\ -x + 3, & x > 2 \end{cases}$$

$$\lim_{x \to 2} g(x) + \lim_{x \to -2^+} g(x) + \lim_{x \to -2^-} g(x)$$

Answer : ______

Round 1 2 3 4 5

Answer : ______

Round 1 2 3 4 5

#4 Calculus – Hustle National MAO Convention 2022

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#4 Calculus – Hustle National MAO Convention 2022

$$g(x) = \begin{cases} -x, & x < -2\\ \frac{1}{2}x^2 - 1, & -2 \le x < 2\\ -x + 3, & x > 2 \end{cases}$$

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Answer : ______

Round 1 2 3 4 5

Answer : ______

#5 Calculus – Hustle National MAO Convention 2022

#5 Calculus – Hustle National MAO Convention 2022

$$\int_{-1}^{3} |x| dx$$

$$\int_{-1}^{3} |x| dx$$

Answer : ______

Answer : ______

Round 1 2 3 4 5

Round 1 2 3 4 5

#5 Calculus – Hustle National MAO Convention 2022

#5 Calculus – Hustle National MAO Convention 2022

$$\int_{-1}^{3} |x| dx$$

$$\int_{-1}^{3} |x| dx$$

Answer : ______

Round 1 2 3 4 5

Answer : ______

#6 Calculus – Hustle National MAO Convention 2022

$$\int_{\frac{\pi}{4}}^{\frac{3\pi}{2}} \frac{1}{3} \theta^2 dx$$

Answer : _____

Round 1 2 3 4 5

#6 Calculus – Hustle National MAO Convention 2022

$$\int_{\frac{\pi}{4}}^{\frac{3\pi}{2}} \frac{1}{3} \theta^2 dx$$

Answer : _____

Round 1 2 3 4 5

#6 Calculus – Hustle National MAO Convention 2022

$$\int_{\frac{\pi}{4}}^{\frac{3\pi}{2}} \frac{1}{3} \theta^2 dx$$

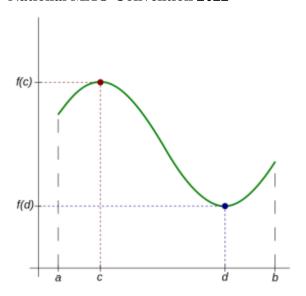
Answer: _______ Round 1 2 3 4 5

#6 Calculus – Hustle National MAO Convention 2022

$$\int_{\frac{\pi}{4}}^{\frac{3\pi}{2}} \frac{1}{3} \theta^2 dx$$

Answer : _____

#7 Calculus – Hustle National MAO Convention 2022

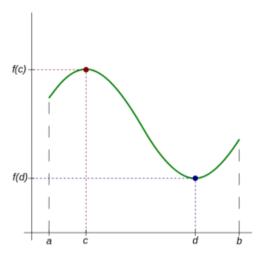


If a function f(x) is continuous on a closed interval [a, b], then f(x) has both a maximum and a minimum on [a, b]. Give the **acronym** of this theorem.

Answer : _____

Round 1 2 3 4 5

#7 Calculus – Hustle National MAO Convention 2022

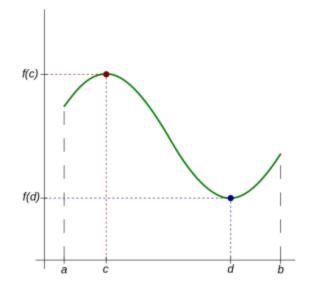


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Answer : _____

Round 1 2 3 4 5

#7 Calculus – Hustle National MAO Convention 2022

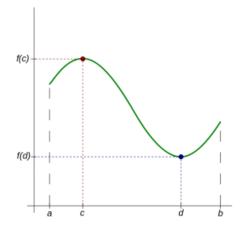


If a function f(x) is continuous on a closed interval [a, b], then f(x) has both a maximum and a minimum on [a, b]. Give the <u>acronym</u> of this theorem.

Answer : _____

Round 1 2 3 4 5

#7 Calculus – Hustle National MAO Convention 2022



If a function f(x) is continuous on a closed interval [a, b], then f(x) has both a maximum and a minimum on [a, b]. Give the **acronym** of this theorem.

Answer:

#8 Calculus – Hustle **National MAO Convention 2022**

$$f(x) = x^2 cos(x)$$

$$f'\left(\frac{\pi}{4}\right) = ?$$

#8 Calculus – Hustle

National MAO Convention 2022

$$f(x) = x^2 cos(x)$$

$$f'\left(\frac{\pi}{4}\right) = ?$$

Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

#8 Calculus – Hustle **National MAO Convention 2022**

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#9 Calculus – Hustle National MAO Convention 2022

Round 1 2 3 4 5

A right cylinder filled with water has a 4-foot radius and 12-foot height. It is drained such that the depth of the water is decreasing at 0.4 feet per second. How fast is the water draining from the tank?

Answer : ______ Answer : _____

#9 Calculus – Hustle National MAO Convention 2022

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Answer : _____

Round 1 2 3 4 5

#9 Calculus – Hustle National MAO Convention 2022

#9 Calculus – Hustle

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Round 1 2 3 4 5

National MAO Convention 2022

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Answer : _____

#10 Calculus – Hustle National MAO Convention 2022

If the average value of f(x) on the interval [0,2] is 1.4; find the value of :

$$\int_{2}^{0} f(x) dx$$

Answer : _____

Round 1 2 3 4 5

#10 Calculus – Hustle National MAO Convention 2022

If the average value of f(x) on the interval [0,2] is 1.4; find the value of :

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Answer : _____

Round 1 2 3 4 5

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Round 1 2 3 4 5

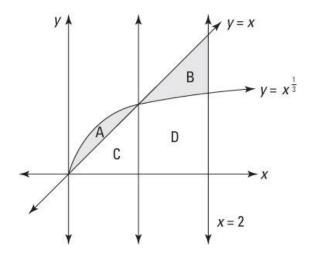
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If the average value of f(x) on the interval [0,2] is 1.4; find the value of :

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Answer : ______

#11 Calculus – Hustle National MAO Convention 2022

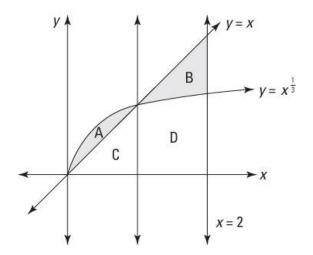


Find the difference between Area D and Area C.

Answer : ______

Round 1 2 3 4 5

#11 Calculus – Hustle National MAO Convention 2022

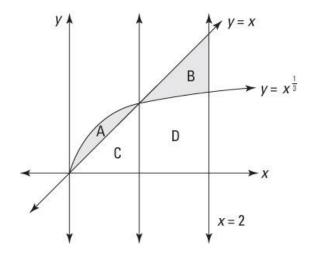


Find the difference between Area D and Area C.

Answer : _____

Round 1 2 3 4 5

#11 Calculus – Hustle National MAO Convention 2022

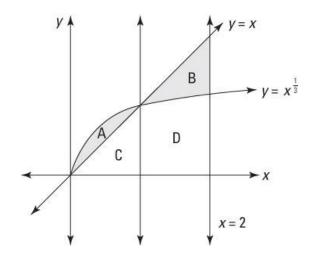


Find the difference between Area D and Area C.

Answer : _____

Round 1 2 3 4 5

#11 Calculus – Hustle National MAO Convention 2022



Find the difference between Area D and Area C.

Answer : _____

#12 Calculus – Hustle National MAO Convention 2022

Using the graphs of the equations:

$$f(x) = x^2 + 2x$$

$$g(x) = 48$$

Find the area between the curves.

Answer	:	

Round 1 2 3 4 5

#12 Calculus – Hustle National MAO Convention 2022

Using the graphs of the equations:

$$f(x) = x^2 + 2x$$

$$g(x) = 48$$

Find the area between the curves.

Answer : ______

Round 1 2 3 4 5

#12 Calculus – Hustle National MAO Convention 2022

Using the graphs of the equations:

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_				
Answer	•			
3113WC1	•			

Round 1 2 3 4 5

#12 Calculus – Hustle National MAO Convention 2022

Using the graphs of the equations:

$$f(x) = x^2 + 2x$$

$$g(x) = 48$$

Find the area between the curves.

Answer : _____

#13 Calculus – Hustle National MAO Convention 2022

Find the volume of the solid of revolution generated by revolving the region bounded by $y = \sqrt{1 - x^2}$ and y = 0 about the *x*-axis.

#13 Calculus – Hustle National MAO Convention 2022

Find the volume of the solid of revolution generated by revolving the region bounded by $y = \sqrt{1 - x^2}$ and y = 0 about the *x*-axis.

Answer :				
	hemor	•		

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#13 Calculus – Hustle National MAO Convention 2022

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Answer : _____

Round 1 2 3 4 5

Answer : ______

#14 Calculus – Hustle National MAO Convention 2022

Determine if the graph of the equation is Increasing (I), Decreasing (D) or Neither (N) at the point when x = -1.

 $x^2y = 4$

Answer : ______

Round 1 2 3 4 5

#14 Calculus – Hustle National MAO Convention 2022

Determine if the graph of the equation is Increasing (I), Decreasing (D) or Neither (N) at the point when x = -1.

 $x^2y = 4$

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Round 1 2 3 4 5

#14 Calculus – Hustle National MAO Convention 2022

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Answer : _____

Round 1 2 3 4 5

#14 Calculus – Hustle National MAO Convention 2022

Determine if the graph of the equation is Increasing (I), Decreasing (D) or Neither (N) at the point when x = -1.

 $x^2y = 4$

Answer : _____

#15 Calculus – Hustle National MAO Convention 2022

The derivative of a function is given as:

$$\frac{dy}{dx} = 2x^2 - 3x + 1$$

Find the equation of the tangent line to the function in slope-intercept form when x = -4 if a point on the function is (0,1).

Answer : _____

Round 1 2 3 4 5

itional MAO Convention 2022

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National MAO Convention 2022

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#15 Calculus – Hustle

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Round 1 2 3 4 5

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Answer : _____

Round 1 2 3 4 5

Answer : _____

#16 Calculus – Hustle National MAO Convention 2022

$$\int_{-1}^{\frac{3}{2}}\cos(\pi y)\,dy$$

#16 Calculus – Hustle National MAO Convention 2022

$$\int_{-1}^{\frac{3}{2}}\cos(\pi y)\,dy$$

Answer : ______

Round 1 2 3 4 5

Answer : ______

Round 1 2 3 4 5

#16 Calculus – Hustle National MAO Convention 2022

$$\int_{-1}^{\frac{3}{2}}\cos(\pi y)\,dy$$

#16 Calculus – Hustle National MAO Convention 2022

$$\int_{-1}^{\frac{3}{2}}\cos(\pi y)\,dy$$

Answer : _____

Round 1 2 3 4 5

Answer : ______

#17 Calculus – Hustle National MAO Convention 2022

$$\lim_{x\to\infty} \frac{\sqrt[5]{x^6 - 7x}}{e^{6x}}$$

#17 Calculus – Hustle National MAO Convention 2022

$$\lim_{x \to \infty} \frac{\sqrt[5]{x^6 - 7x}}{e^{6x}}$$

Answer : ______

Round 1 2 3 4 5

Answer : ______

Round 1 2 3 4 5

#17 Calculus – Hustle National MAO Convention 2022

$$\lim_{x \to \infty} \frac{\sqrt[5]{x^6 - 7x}}{e^{6x}}$$

#17 Calculus – Hustle National MAO Convention 2022

$$\lim_{x \to \infty} \frac{\sqrt[5]{x^6 - 7x}}{e^{6x}}$$

Answer : _____

Answer : ______

Round 1 2 3 4 5

#18 Calculus – Hustle National MAO Convention 2022 #18 Calculus – Hustle National MAO Convention 2022

$$\int_{-1}^{0} \sec(\pi x) \tan(\pi x) \, dx$$

$$\int_{-1}^{0} \sec(\pi x) \tan(\pi x) \, dx$$

Answer : ______

Round 1 2 3 4 5

Answer : _____

Round 1 2 3 4 5

#18 Calculus – Hustle National MAO Convention 2022

$$\int_{-1}^{0} \sec(\pi x) \tan(\pi x) \, dx$$

$$\int_{-1}^{0} \sec(\pi x) \tan(\pi x) \, dx$$

Answer : ______

Round 1 2 3 4 5

Answer : _____

#19 Calculus – Hustle National MAO Convention 2022

Find the instantaneous rate of change of the following function:

$$y = 6^{3x^2}x^4$$

when x = 1

Answer : ______

Round 1 2 3 4 5

#19 Calculus – Hustle National MAO Convention 2022

Find the instantaneous rate of change of the following function:

$$y = 6^{3x^2}x^4$$

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Answer : ______

Round 1 2 3 4 5

#19 Calculus – Hustle National MAO Convention 2022

Find the instantaneous rate of change of the following function:

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Answer : _____

Round 1 2 3 4 5

#19 Calculus – Hustle National MAO Convention 2022

Find the instantaneous rate of change of the following function:

$$y = 6^{3x^2}x^4$$

when x = 1

Answer : _____

#20 Calculus – Hustle National MAO Convention 2022

Find the minimum value of the function $y = -2x^3 - \frac{7}{2}x^2 + 5x + 1$

on the interval [-1,3]

Answer : ______

Round 1 2 3 4 5

#20 Calculus – Hustle National MAO Convention 2022

Find the minimum value of the function $y = -2x^3 - \frac{7}{2}x^2 + 5x + 1$

on the interval [-1,3]

Answer : _____

Round 1 2 3 4 5

#20 Calculus – Hustle National MAO Convention 2022

Find the minimum value of the function $y = -2x^3 - \frac{7}{2}x^2 + 5x + 1$

on the interval [-1,3]

Answer : _____

Round 1 2 3 4 5

#20 Calculus – Hustle National MAO Convention 2022

Find the minimum value of the function $y = -2x^3 - \frac{7}{2}x^2 + 5x + 1$

on the interval [-1,3]

Answer : _____

#21 Calculus – Hustle National MAO Convention 2022

A particle's position on the x-axis can be described by the function.

$$s(t) = -6t^3 + 8t^4 + 5$$

Find the interval(s), $t \ge 0$, for which the speed of the particle is increasing.

Answer : ______

Round 1 2 3 4 5

#21 Calculus – Hustle National MAO Convention 2022

A particle's position on the x-axis can be described by the function.

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Find the interval(s), $t \ge 0$, for which the speed of the particle is increasing.

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Round 1 2 3 4 5

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Round 1 2 3 4 5

#21 Calculus – Hustle National MAO Convention 2022

A particle's position on the x-axis can be described by the function.

$$s(t) = -6t^3 + 8t^4 + 5$$

Find the interval(s), $t \ge 0$, for which the speed of the particle is increasing.

Answer : _____

#22 Calculus – Hustle National MAO Convention 2022

Find the average value of the function:

$$y = -2x^3 + 4x^2 - 5x + 1$$

on the interval [-1,3]

Answer : ______

Round 1 2 3 4 5

#22 Calculus – Hustle National MAO Convention 2022

Find the average value of the function:

$$y = -2x^3 + 4x^2 - 5x + 1$$

on the interval [-1,3]

Answer : _____

Round 1 2 3 4 5

#22 Calculus – Hustle National MAO Convention 2022

Find the average value of the function:

$$y = -2x^3 + 4x^2 - 5x + 1$$

on the interval [-1,3]

Answer : _____

Round 1 2 3 4 5

#22 Calculus – Hustle National MAO Convention 2022

Find the average value of the function:

$$y = -2x^3 + 4x^2 - 5x + 1$$

on the interval [-1,3]

Answer : _____

#23 Calculus – Hustle National MAO Convention 2022

	X	У
	-2	-1
A	-1	-4
	0	-5
	1	4

	Х	у
ъ	-2	4
B	-1	1
	0	0
	1	-1

	X	У
	-2	0
D	-1	2
	0	4
	1	6
		-

#23 Calculus – Hustle National MAO Convention 2022

	X	y
	-2	-1
A	-1	-4
	0	-5
	1	4

	Х	у
ъ	-2	4
В	-1	1
	0	0
	1	-1

	X	y
•	-2	6
C	-1	3
	0	0
	1	3

	Х	У
	-2	0
D	-1	2
	0	4
	1	6

Give the letter for the function with the least average rate of change of y on x for the interval [-2,0].

Answer : ______

Round 1 2 3 4 5

Give the letter for the function with the least average rate of change of y on x for the interval [-2,0].

Answer : ______

Round 1 2 3 4 5

#23 Calculus – Hustle National MAO Convention 2022





	X	У
	-2	6
C	- 1	3
	0	0
	1	3

	X	у
	-2	0
D	-1	2
	0	4
	1	6

#23 Calculus – Hustle National MAO Convention 2022

	X	y
	-2	-1
A	- 1	-4
	0	-5
	1	4



	X	У
	-2	6
C	-1	3
	0	0
	1	3



Give the letter for the function with the least average rate of change of y on x for the interval [-2,0].

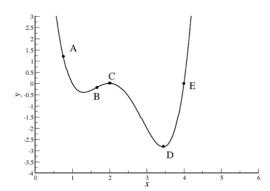
Answer : ______

Round 1 2 3 4 5

Give the letter for the function with the least average rate of change of y on x for the interval [-2,0].

Answer : ______

#24 Calculus – Hustle National MAO Convention 2022

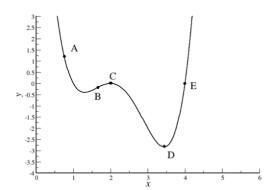


Given the graph above which represents the derivative of an equation with x-coordinates labeled as letters A-E, find all x coordinates (Letters A-E) of points of inflection of the original equation's graph.

Answer : ______

Round 1 2 3 4 5

#24 Calculus – Hustle National MAO Convention 2022

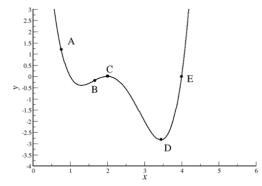


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Round 1 2 3 4 5

#24 Calculus – Hustle National MAO Convention 2022

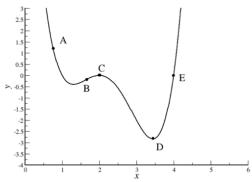


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Answer : _____

Round 1 2 3 4 5

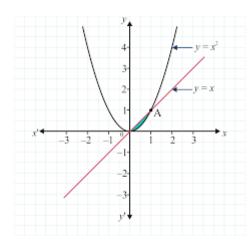
#24 Calculus – Hustle National MAO Convention 2022



Given the graph above which represents the derivative of an equation with x-coordinates labeled as letters A-E, find all x coordinates (Letters A-E) of points of inflection of the original equation's graph.

Answer : _____

#25 Calculus – Hustle National MAO Convention 2022

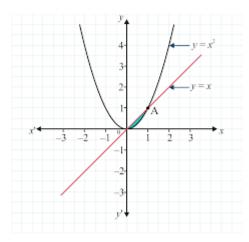


Find the exact value of the area of the shaded region.

Answer : _____

Round 1 2 3 4 5

#25 Calculus – Hustle National MAO Convention 2022

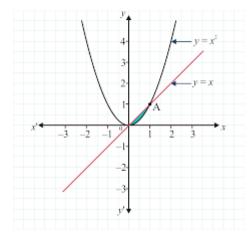


Find the exact value of the area of the shaded region.

Answer : _____

Round 1 2 3 4 5

#25 Calculus – Hustle National MAO Convention 2022

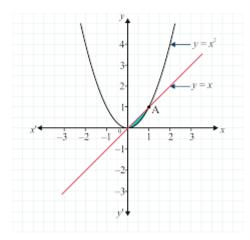


Find the exact value of the area of the shaded region.

Answer : _____

Round 1 2 3 4 5

#25 Calculus – Hustle National MAO Convention 2022



Find the exact value of the area of the shaded region.

Answer : _____