#### #1 Precalculus - Hustle **MAO National Convention 2022**

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Find the value of the sum:

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$$\sum_{n=1}^{\infty} \frac{1^n - 2^n + 3^n}{6^n}$$

$$\sum_{n=1}^{\infty} \frac{1^n - 2^n + 3^n}{6^n}$$

Answer:

Round: 1 2 3 4 5

Answer: \_\_\_\_\_

Round: 1 2 3

5

4

#1 Precalculus – Hustle **MAO National Convention 2022** 

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Find the value of the sum:

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$$\sum_{n=1}^{\infty} \frac{1^n - 2^n + 3^n}{6^n}$$

$$\sum_{n=1}^{\infty} \frac{1^n - 2^n + 3^n}{6^n}$$

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

Round: 1 2

3 4 5

Round: 1 2 3 4

#### #2 Precalculus - Hustle **MAO National Convention 2022**

Suppose  $8^{a_1} = 9.9^{a_2} = 10...$  $127^{a_{120}} = 128$ . Find the product  $a_1 a_2 a_3 \dots a_{120}$ .

#### #2 Precalculus - Hustle **MAO National Convention 2022**

Suppose  $8^{a_1} = 9.9^{a_2} = 10...$  $127^{a_{120}} = 128$ . Find the product  $a_1 a_2 a_3 \dots a_{120}$ .

Answer: \_\_\_\_\_

Round: 2 1

3

4

5

5

Answer: \_\_\_\_\_

Round: 1

2

3

4

5

#### #2 Precalculus – Hustle **MAO National Convention 2022**

Suppose  $8^{a_1} = 9.9^{a_2} = 10...$  $127^{a_{120}} = 128$ . Find the product  $a_1 a_2 a_3 \dots a_{120}$ .

#2 Precalculus – Hustle **MAO National Convention 2022** 

Suppose  $8^{a_1} = 9.9^{a_2} = 10...$  $127^{a_{120}} = 128$ . Find the product  $a_1 a_2 a_3 \dots a_{120}$ .

Answer:

Answer: \_\_\_\_

Round: 1 2 3 4 Round: 1

2

3

4

### #3 Precalculus – Hustle MAO National Convention 2022

Find the area interior to the parallelogram with side lengths  $2\sqrt{6}$  and  $3\sqrt{2}$  and interior angle  $60^{\circ}$ .

### #3 Precalculus – Hustle MAO National Convention 2022

Find the area interior to the parallelogram with side lengths  $2\sqrt{6}$  and  $3\sqrt{2}$  and interior angle  $60^{\circ}$ .

| Answer: | Answer: |
|---------|---------|
|         |         |

Round:

Round: 1 2 3 4 5

# #3 Precalculus – Hustle MAO National Convention 2022

2

3

4

5

1

# #3 Precalculus – Hustle MAO National Convention 2022

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Answer: \_\_\_\_\_ Answer: \_\_\_\_

#### #4 Precalculus - Hustle **MAO National Convention 2022**

Find the product of all values of x that make the matrix singular:

$$\begin{bmatrix} x+2 & 9 \\ 4 & x+2 \end{bmatrix}.$$

#### #4 Precalculus - Hustle **MAO National Convention 2022**

Find the product of all values of x that make the matrix singular:

$$\begin{bmatrix} x+2 & 9 \\ 4 & x+2 \end{bmatrix}.$$

Answer:

Round: 1

2 3

4 5

Answer:

Round: 1 2 3

4

5

#### #4 Precalculus – Hustle **MAO National Convention 2022**

Find the product of all values of x that make the matrix singular:

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#### #4 Precalculus – Hustle **MAO National Convention 2022**

Find the product of all values of x that make the matrix singular:

$$\begin{bmatrix} x+2 & 9 \\ 4 & x+2 \end{bmatrix}.$$

Answer: \_\_\_\_\_

Answer:

Round:

1

2

3

4

5

Round: 1

2 3

4

### #5 Precalculus – Hustle MAO National Convention 2022

Find the product of the slopes of the asymptotes of the graph of  $x(t) = 2\tan(t)$ ,  $y(t) = \sec(t)$ .

## #5 Precalculus – Hustle MAO National Convention 2022

Find the product of the slopes of the asymptotes of the graph of  $x(t) = 2\tan(t)$ ,  $y(t) = \sec(t)$ .

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

5

Answer:

Round:

1

2

3

4

5

## #5 Precalculus – Hustle MAO National Convention 2022

Find the product of the slopes of the asymptotes of the graph of  $x(t) = 2\tan(t)$ ,  $y(t) = \sec(t)$ .

## **#5 Precalculus – Hustle MAO National Convention 2022**

Find the product of the slopes of the asymptotes of the graph of  $x(t) = 2\tan(t)$ ,  $y(t) = \sec(t)$ .

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

Round: 1 2 3 4

Round:

1

2

3

5

#### #6 Precalculus - Hustle **MAO National Convention 2022**

#### #6 Precalculus - Hustle **MAO National Convention 2022**

Find the domain in interval notation:

$$f(x) = \log_{2022} \left(4 - \left|\frac{x}{2}\right|\right).$$

Find the domain in interval notation:

$$f(x) = \log_{2022} \left(4 - \left|\frac{x}{2}\right|\right).$$

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

Round:

1

2

3

4

5

#6 Precalculus – Hustle **MAO National Convention 2022** 

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Find the domain in interval notation:

$$f(x) = \log_{2022} \left(4 - \left|\frac{x}{2}\right|\right).$$

Find the domain in interval notation:

$$f(x) = \log_{2022} \left(4 - \left|\frac{x}{2}\right|\right).$$

Answer:

4

5

Answer: \_\_\_\_\_

Round: 2 3 1

Round: 1

2

5

#### #7 Precalculus - Hustle **MAO National Convention 2022**

Find the constant term in the expansion  $\left(2x^2 - \frac{1}{r}\right)^9$ .

#### #7 Precalculus - Hustle **MAO National Convention 2022**

Find the constant term in the expansion  $\left(2x^2 - \frac{1}{r}\right)^9$ .

Answer: \_\_\_\_\_

Round: 1 2 3

4 5

Answer:

Round: 1 2 3

4 5

#### #7 Precalculus – Hustle **MAO National Convention 2022**

Find the constant term in the expansion  $\left(2x^2 - \frac{1}{x}\right)^9$ .

#7 Precalculus – Hustle **MAO National Convention 2022** 

Find the constant term in the expansion  $\left(2x^2 - \frac{1}{x}\right)^9$ .

Answer:

Answer:

Round:

1

2

3

4

5

Round: 1

2 3

4

#### #8 Precalculus – Hustle MAO National Convention 2022

The side lengths of a triangle are in arithmetic progression. If its largest angle is  $120^{\circ}$ , find the ratio of the largest to smallest sides.

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The side lengths of a triangle are in arithmetic progression. If its largest angle is  $120^{\circ}$ , find the ratio of the largest to smallest sides.

| Answer:    |   |   |   |   |   | Answer: _  | Answer: |   |   |   |   |  |  |
|------------|---|---|---|---|---|------------|---------|---|---|---|---|--|--|
| <b>5</b> 1 | 4 | 2 | 2 | 4 | _ | <b>D</b> 1 | 4       | 2 | 2 | 4 | _ |  |  |
| Round:     | 1 | 2 | 3 | 4 | 5 | Round:     | 1       | 2 | 3 | 4 | 5 |  |  |

#### #8 Precalculus – Hustle MAO National Convention 2022

The side lengths of a triangle are in arithmetic progression. If its largest angle is  $120^{\circ}$ , find the ratio of the largest to smallest sides.

Round:

1

2

3

4

5

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

The side lengths of a triangle are in arithmetic progression. If its largest angle is  $120^{\circ}$ , find the ratio of the largest to smallest sides.

2

3

4

5

1

| Answer: | Answer: |  |
|---------|---------|--|
|         |         |  |

Round:

# #9 Precalculus – Hustle MAO National Convention 2022

Find the sum of solutions on  $[0, 2\pi)$  to

$$2\sin(2x) + 1 = 0$$

# **#9 Precalculus – Hustle MAO National Convention 2022**

Find the sum of solutions on  $[0, 2\pi)$  to

$$2\sin(2x) + 1 = 0$$

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

5

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

#9 Precalculus – Hustle
MAO National Convention 2022

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#9 Precalculus – Hustle
MAO National Convention 2022

Find the sum of solutions on  $[0, 2\pi)$  to

$$2\sin(2x) + 1 = 0$$

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

Round: 1 2 3 4

Round:

1 2

3

4

# **#10 Precalculus – Hustle MAO National Convention 2022**

Let  $\sin t - \cos t = \frac{1}{2}$ . Find  $\sin(2t)$ .

# **#10 Precalculus – Hustle MAO National Convention 2022**

Let  $\sin t - \cos t = \frac{1}{2}$ . Find  $\sin(2t)$ .

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

Answer: \_\_\_\_\_

Round:

1

3

4

5

#10 Precalculus – Hustle MAO National Convention 2022

Let  $\sin t - \cos t = \frac{1}{2}$ . Find  $\sin(2t)$ .

**#10 Precalculus – Hustle MAO National Convention 2022** 

2

Let  $\sin t - \cos t = \frac{1}{2}$ . Find  $\sin(2t)$ .

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

Round:

1

2

3

4

#### #11 Precalculus – Hustle **MAO National Convention 2022**

Evaluate 
$$\lim_{x \to \infty} \frac{(2x-1)(3x+1)^2}{(2x-1)^2(3x+1)}$$
.

#### #11 Precalculus - Hustle **MAO National Convention 2022**

Evaluate 
$$\lim_{x\to\infty} \frac{(2x-1)(3x+1)^2}{(2x-1)^2(3x+1)}$$
.

Answer: \_\_\_\_\_

Round: 1 2 3 4 5

Answer: \_\_\_\_\_

Round: 1 2 3

4 5

#11 Precalculus – Hustle **MAO National Convention 2022** 

Evaluate  $\lim_{x \to \infty} \frac{(2x-1)(3x+1)^2}{(2x-1)^2(3x+1)}$ .

#11 Precalculus – Hustle **MAO National Convention 2022** 

Evaluate  $\lim_{x \to \infty} \frac{(2x-1)(3x+1)^2}{(2x-1)^2(3x+1)}$ .

Answer: \_\_\_\_\_

4 5 Round: 1 2 3 Round: 1 2 3 4 5

# **#12 Precalculus – Hustle MAO National Convention 2022**

If 
$$\frac{x^3+5x^2+ax+b}{x+1} = x^2+cx+2$$
 for values  $a$ ,  $b$ ,  $c$ , find the value of  $a+b+c$ .

# **#12 Precalculus – Hustle MAO National Convention 2022**

If 
$$\frac{x^3+5x^2+ax+b}{x+1} = x^2 + cx + 2$$
 for values  $a$ ,  $b$ ,  $c$ , find the value of  $a+b+c$ .

Answer: \_\_\_\_\_

4

5

Round: 1 2 3

# #12 Precalculus – Hustle MAO National Convention 2022

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 for values  $a$ ,  $b$ ,  $c$ , find the value of  $a+b+c$ .

Answer: \_\_\_\_\_

Round: 1 2 3 4 5

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$$\frac{x^3+5x^2+ax+b}{x+1} = x^2+cx+2$$
 for values  $a$ ,  $b$ ,  $c$ , find the value of  $a+b+c$ .

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

# **#13 Precalculus – Hustle MAO National Convention 2022**

Where defined, simplify the expression to one single trig function:

$$\frac{1}{\tan x(\csc x - \sin x)}$$

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$$\frac{1}{\tan x(\csc x - \sin x)}$$

Answer: \_\_\_\_\_

5

Round: 1 2 3 4

# **#13 Precalculus – Hustle MAO National Convention 2022**

Where defined, simplify the expression to one single trig function:

$$\frac{1}{\tan x(\csc x - \sin x)}$$

Answer: \_\_\_\_\_

Round: 1 2 3 4 5

### **#13 Precalculus – Hustle MAO National Convention 2022**

Where defined, simplify the expression to one single trig function:

$$\frac{1}{\tan x(\csc x - \sin x)}$$

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

# **#14 Precalculus – Hustle MAO National Convention 2022**

$$z = \sqrt[6]{2}(\cos\frac{\pi}{8} + i\sin\frac{\pi}{8})$$
 where  $i = \sqrt{-1}$ . Let  $z^{12} = a + bi$  for real  $a, b$ . Find  $a + b$ .

# **#14 Precalculus – Hustle MAO National Convention 2022**

$$z = \sqrt[6]{2}(\cos\frac{\pi}{8} + i\sin\frac{\pi}{8})$$
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Answer: \_\_\_\_\_

Round: 1 2 3 4 5

# **#14 Precalculus – Hustle MAO National Convention 2022**

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Answer: \_\_\_\_\_

Round: 1 2 3 4 5

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 where  $i = \sqrt{-1}$ . Let  $z^{12} = a + bi$  for real  $a, b$ . Find  $a + b$ .

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

### #15 Precalculus – Hustle MAO National Convention 2022

Chris owns 4 purple shirts and 4 green shirts. Shirts of the same color are identical. If he selects 2 shirts at random, what is the probability of getting one of each color? Write as a reduced fraction.

Answer.

Round:

1

2

3

4

5

#### #15 Precalculus – Hustle MAO National Convention 2022

Chris owns 4 purple shirts and 4 green shirts. Shirts of the same color are identical. If he selects 2 shirts at random, what is the probability of getting one of each color? Write as a reduced fraction.

|   |   |   |   |       |    | 71154461   |   |   |   |   |   |  |  |
|---|---|---|---|-------|----|--|---|---|---|---|---|--|--|
| Round:  | 1 | 2 | 3 | 4     | 5  | Round:   | 1   | 2 | 3 | 4 | 5 |  |  |
| #15 Preca<br>MAO Nat  |   |   |   | n 202 | 22 | #15 Precalculus – Hustle<br>MAO National Convention 2022 |   |   |   |   |   |  |  |
| Chris owns 4 purple shirts and 4 green shirts. Shirts of the same color are identical. If he selects 2 shirts at random, what is the probability of getting one of each color? Write as a reduced fraction. |   |   |   |       |    | shirts. S<br>identica<br>random<br>getting               | Chris owns 4 purple shirts and 4 green shirts. Shirts of the same color are identical. If he selects 2 shirts at random, what is the probability of getting one of each color? Write as a reduced fraction. |   |   |   |   |  |  |
| Answer: <sub>-</sub>  |   |   |   |       |    | Answer   |   |   |   |   |   |  |  |

Answer.

Round:

2

3

1

4

# **#16 Precalculus – Hustle MAO National Convention 2022**

Let  $f(x) = \sin(x)$  and g(x) = 2x. How many solutions on  $[0, 2\pi)$  are there to  $(f \circ g)(x) = (g \circ f)(x)$ ?

# **#16 Precalculus – Hustle MAO National Convention 2022**

Let  $f(x) = \sin(x)$  and g(x) = 2x. How many solutions on  $[0, 2\pi)$  are there to  $(f \circ g)(x) = (g \circ f)(x)$ ?

Answer: \_\_\_\_\_

Round:

1

2

3

5

4

Answer:

Round:

1

2

3

4

5

### **#16 Precalculus – Hustle MAO National Convention 2022**

Let  $f(x) = \sin(x)$  and g(x) = 2x. How many solutions on  $[0, 2\pi)$  are there to  $(f \circ g)(x) = (g \circ f)(x)$ ? **#16 Precalculus – Hustle MAO National Convention 2022** 

Let  $f(x) = \sin(x)$  and g(x) = 2x. How many solutions on  $[0, 2\pi)$  are there to  $(f \circ g)(x) = (g \circ f)(x)$ ?

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

Round:

1

2

3

5

# #17 Precalculus – Hustle MAO National Convention 2022

Let  $\mathbf{u} = 3\mathbf{i} - 4\mathbf{j}$  and  $\mathbf{v} = 2\mathbf{i} + 3\mathbf{j}$ . Find the dot product  $\mathbf{u} \cdot \mathbf{v}$ .

# **#17 Precalculus – Hustle MAO National Convention 2022**

Let  $\mathbf{u} = 3\mathbf{i} - 4\mathbf{j}$  and  $\mathbf{v} = 2\mathbf{i} + 3\mathbf{j}$ . Find the dot product  $\mathbf{u} \cdot \mathbf{v}$ .

Answer: \_\_\_\_\_\_

5

Round: 1 2 3 4

# #17 Precalculus – Hustle MAO National Convention 2022

Let  $\mathbf{u} = 3\mathbf{i} - 4\mathbf{j}$  and  $\mathbf{v} = 2\mathbf{i} + 3\mathbf{j}$ . Find the dot product  $\mathbf{u} \cdot \mathbf{v}$ .

Answer: \_\_\_\_\_

Round: 1 2 3 4 5

### **#17 Precalculus – Hustle MAO National Convention 2022**

Let  $\mathbf{u} = 3\mathbf{i} - 4\mathbf{j}$  and  $\mathbf{v} = 2\mathbf{i} + 3\mathbf{j}$ . Find the dot product  $\mathbf{u} \cdot \mathbf{v}$ .

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

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

Let *S* be the sum of the first 20 positive odd integers. Let *T* be the sum of the first 20 positive integer multiples of 3. How much more is *T* than *S*?

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

Let *S* be the sum of the first 20 positive odd integers. Let *T* be the sum of the first 20 positive integer multiples of 3. How much more is *T* than *S*?

| Answer:  | <br> |   |   |   | Answer: |   |   |   |   |   |
|----------|------|---|---|---|---------|---|---|---|---|---|
| Round: 1 | 2    | 2 | 1 | 5 | Round:  | 1 | 2 | 3 | 1 | 5 |

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

Let *S* be the sum of the first 20 positive odd integers. Let *T* be the sum of the first 20 positive integer multiples of 3. How much more is *T* than *S*?

### **#18 Precalculus – Hustle MAO National Convention 2022**

Let *S* be the sum of the first 20 positive odd integers. Let *T* be the sum of the first 20 positive integer multiples of 3. How much more is *T* than *S*?

| Answer: | <br>Answer: |  |
|---------|-------------|--|
|         |             |  |

#### #19 Precalculus – Hustle **MAO National Convention 2022**

Find the minimum value of  $f(x) = 2(3 - 2x)^2 - 5.$ 

#### #19 Precalculus - Hustle **MAO National Convention 2022**

Find the minimum value of  $f(x) = 2(3 - 2x)^2 - 5.$ 

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

Answer: \_\_\_\_\_

Round: 1

2

3

5

4

#19 Precalculus - Hustle **MAO National Convention 2022** 

Find the minimum value of  $f(x) = 2(3 - 2x)^2 - 5.$ 

#19 Precalculus - Hustle **MAO National Convention 2022** 

Find the minimum value of  $f(x) = 2(3 - 2x)^2 - 5.$ 

Answer:

Answer:

2 3 4 5 Round: 1 2 4 5 Round: 1 3

# **#20 Precalculus – Hustle MAO National Convention 2022**

Let  $f(x) = \frac{1+x}{1-x}$ . Where defined, if  $f\left(f\left(f(x)\right)\right) = ax + b$  for real numbers a, b, find a + b.

# **#20 Precalculus – Hustle MAO National Convention 2022**

Let  $f(x) = \frac{1+x}{1-x}$ . Where defined, if  $f\left(f\left(f(x)\right)\right) = ax + b$  for real numbers a, b, find a + b.

Answer: \_\_\_\_\_

Round:

1

2

3

5

Answer: \_\_\_\_\_

Round:

1

3

4

5

# **#20 Precalculus – Hustle MAO National Convention 2022**

Let  $f(x) = \frac{1+x}{1-x}$ . Where defined, if  $f\left(f\left(f(x)\right)\right) = ax + b$  for real numbers a, b, find a + b.

**#20 Precalculus – Hustle MAO National Convention 2022** 

2

Let  $f(x) = \frac{1+x}{1-x}$ . Where defined, if  $f\left(f\left(f(x)\right)\right) = ax + b$  for real numbers a, b, find a + b.

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

Round:

1

2

3

5

# **#21 Precalculus – Hustle MAO National Convention 2022**

If  $4^x = 8 + 2^{x+1}$ , find the product of all real solutions.

# #21 Precalculus – Hustle MAO National Convention 2022

If  $4^x = 8 + 2^{x+1}$ , find the product of all real solutions.

Answer: \_\_\_\_\_

Round: 1 2 3 4 5

# #21 Precalculus – Hustle MAO National Convention 2022

If  $4^x = 8 + 2^{x+1}$ , find the product of all real solutions.

Answer: \_\_\_\_\_

3

4

5

Round: 1 2

# **#21 Precalculus – Hustle MAO National Convention 2022**

If  $4^x = 8 + 2^{x+1}$ , find the product of all real solutions.

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

### **#22 Precalculus – Hustle MAO National Convention 2022**

Emily starts with the number 100 and Barb starts with the number 1. At each turn, Emily adds 10 to her number and Barb doubles her number. What is the least number of turns needed for Barb's number to be greater than or equal to Emily's?

Round:

#### #22 Precalculus – Hustle MAO National Convention 2022

Emily starts with the number 100 and Barb starts with the number 1. At each turn, Emily adds 10 to her number and Barb doubles her number. What is the least number of turns needed for Barb's number to be greater than or equal to Emily's?

| Answer:   |   |   |   |       |    | Answer  | : |   |   |   |   |  |
|---|---|---|---|-------|----|---|---|---|---|---|---|--|
| Round:  | 1 | 2 | 3 | 4     | 5  | Round:  | 1 | 2 | 3 | 4 | 5 |  |
| #22 Preca   |   | _ |   | n 202 | 22 | #22 Precalculus – Hustle<br>MAO National Convention 2022  |   |   |   |   |   |  |
| Emily starts with the number 100 and Barb starts with the number 1. At each turn, Emily adds 10 to her number and Barb doubles her number. What is the least number of turns needed for Barb's number to be greater than or equal to Emily's? |   |   |   |       |    | Emily starts with the number 100 and Barb starts with the number 1. At each turn, Emily adds 10 to her number and Barb doubles her number. What is the least number of turns needed for Barb's number to be greater than or equal to Emily's? |   |   |   |   |   |  |
| Answer:   |   |   |   |       |    | Answer  | : |   |   |   |   |  |

Round:

# #23 Precalculus – Hustle MAO National Convention 2022

Find the exact area enclosed by the polar curve  $r=2\sin\theta-6\cos\theta$ .

# **#23 Precalculus – Hustle MAO National Convention 2022**

Find the exact area enclosed by the polar curve  $r=2\sin\theta-6\cos\theta$ .

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

Answer: \_\_\_\_\_

Round:

1

2

3

4

5

### #23 Precalculus – Hustle MAO National Convention 2022

Find the exact area enclosed by the polar curve  $r = 2 \sin \theta - 6 \cos \theta$ .

**#23 Precalculus – Hustle MAO National Convention 2022** 

Find the exact area enclosed by the polar curve  $r = 2 \sin \theta - 6 \cos \theta$ .

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

Round: 1 2 3 4 5

Round: 1

2

3

4

# **#24 Precalculus – Hustle MAO National Convention 2022**

Evaluate  $\cos(2 \operatorname{Arctan}(\frac{3}{4}))$ .

## **#24 Precalculus – Hustle MAO National Convention 2022**

Evaluate  $cos(2 Arctan(\frac{3}{4}))$ .

| _       |  |  |
|---------|--|--|
| Answer: |  |  |

Round: 1 2 3 4 5

# #24 Precalculus – Hustle MAO National Convention 2022

Evaluate  $\cos(2 \operatorname{Arctan}(\frac{3}{4}))$ .

Answer: \_\_\_\_\_

Round: 1 2 3 4 5

# **#24 Precalculus – Hustle MAO National Convention 2022**

Evaluate  $\cos(2 \operatorname{Arctan}(\frac{3}{4}))$ .

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_

# #25 Precalculus – Hustle MAO National Convention 2022

# Find the maximum value of $f(x) = 3\sin(x) - 4\cos(x)$ .

# **#25 Precalculus – Hustle MAO National Convention 2022**

Find the maximum value of  $f(x) = 3\sin(x) - 4\cos(x)$ .

Answer: \_\_\_\_\_

Round: 1 2 3 4 5

Answer:

Round: 1 2 3 4 5

# #25 Precalculus – Hustle MAO National Convention 2022

Find the maximum value of  $f(x) = 3\sin(x) - 4\cos(x)$ .

# **#25 Precalculus – Hustle MAO National Convention 2022**

Find the maximum value of  $f(x) = 3\sin(x) - 4\cos(x)$ .

Answer: \_\_\_\_\_

Answer: \_\_\_\_\_