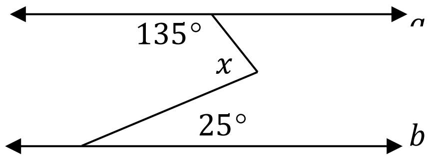
#1 Geometry – Hustle
MAΘ National Convention 2023

Given $a \parallel b$ with angle measures as shown.
Find the measure of x in degrees.

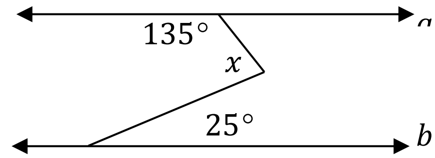


Answer : ____________________

Round 1 2 3 4 5

#1 Geometry – Hustle
MAΘ National Convention 2023

Given $a \parallel b$ with angle measures as shown.
Find the measure of x in degrees.

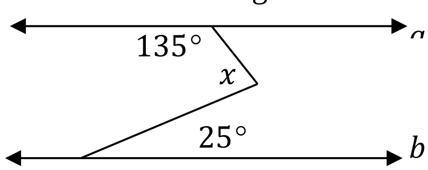


Answer : ____________________

Round 1 2 3 4 5

#1 Geometry – Hustle
MAΘ National Convention 2023

Given $a \parallel b$ with angle measures as shown.
Find the measure of x in degrees.

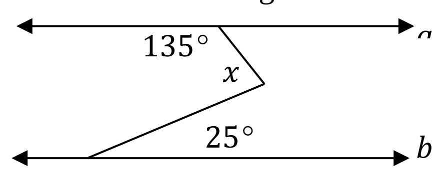


Answer : ____________________

Round 1 2 3 4 5

#1 Geometry – Hustle
MAΘ National Convention 2023

Given $a \parallel b$ with angle measures as shown.
Find the measure of x in degrees.



Answer : ____________________

Round 1 2 3 4 5

#2 Geometry – Hustle
MAΘ National Convention 2023

The apothem of a square is $2\sqrt{2}$. What is the area of the square?

Answer : _____

Round 1 2 3 4 5

#2 Geometry – Hustle
MAΘ National Convention 2023

The apothem of a square is $2\sqrt{2}$. What is the area of the square?

Answer : _____

Round 1 2 3 4 5

#2 Geometry – Hustle
MAΘ National Convention 2023

The apothem of a square is $2\sqrt{2}$. What is the area of the square?

Answer : _____

Round 1 2 3 4 5

#2 Geometry – Hustle
MAΘ National Convention 2023

The apothem of a square is $2\sqrt{2}$. What is the area of the square?

Answer : _____

Round 1 2 3 4 5

#3 Geometry – Hustle
MAΘ National Convention 2023

The measures of two supplementary angles are $m\angle A = (4x + 2)°$ and $m\angle B = (6x + 3)°$. Find the ratio of $m\angle B$ to $m\angle A$.

Answer : _____

Round 1 2 3 4 5

#3 Geometry – Hustle
MAΘ National Convention 2023

The measures of two supplementary angles are $m\angle A = (4x + 2)°$ and $m\angle B = (6x + 3)°$. Find the ratio of $m\angle B$ to $m\angle A$.

Answer : _____

Round 1 2 3 4 5

#3 Geometry – Hustle
MAΘ National Convention 2023

The measures of two supplementary angles are $m\angle A = (4x + 2)°$ and $m\angle B = (6x + 3)°$. Find the ratio of $m\angle B$ to $m\angle A$.

Answer : _____

Round 1 2 3 4 5

#3 Geometry – Hustle
MAΘ National Convention 2023

The measures of two supplementary angles are $m\angle A = (4x + 2)°$ and $m\angle B = (6x + 3)°$. Find the ratio of $m\angle B$ to $m\angle A$.

Answer : _____

Round 1 2 3 4 5

#4 Geometry – Hustle
MAΘ National Convention 2023

What is the area of the region bounded by the graphs of $y = |x| - 5$ and $y = -|x| + 5$?

Answer : _____

Round 1 2 3 4 5

#4 Geometry – Hustle
MAΘ National Convention 2023

What is the area of the region bounded by the graphs of $y = |x| - 5$ and $y = -|x| + 5$?

Answer : _____

Round 1 2 3 4 5

#4 Geometry – Hustle
MAΘ National Convention 2023

What is the area of the region bounded by the graphs of $y = |x| - 5$ and $y = -|x| + 5$?

Answer : _____

Round 1 2 3 4 5

#4 Geometry – Hustle
MAΘ National Convention 2023

What is the area of the region bounded by the graphs of $y = |x| - 5$ and $y = -|x| + 5$?

Answer : _____

Round 1 2 3 4 5

#5 Geometry – Hustle
MAΘ National Convention 2023

Given triangle ABC. Let D be a point on BC such that AD bisects angle A. If $AD = 6$, $BD = 4$, and $DC = 3$, find AB.

Answer : _____

Round 1 2 3 4 5

#5 Geometry – Hustle
MAΘ National Convention 2023

Given triangle ABC. Let D be a point on BC such that AD bisects angle A. If $AD = 6$, $BD = 4$, and $DC = 3$, find AB.

Answer : _____

Round 1 2 3 4 5

#5 Geometry – Hustle
MAΘ National Convention 2023

Given triangle ABC. Let D be a point on BC such that AD bisects angle A. If $AD = 6$, $BD = 4$, and $DC = 3$, find AB.

Answer : _____

Round 1 2 3 4 5

#5 Geometry – Hustle
MAΘ National Convention 2023

Given triangle ABC. Let D be a point on BC such that AD bisects angle A. If $AD = 6$, $BD = 4$, and $DC = 3$, find AB.

Answer : _____

Round 1 2 3 4 5

#6 Geometry – Hustle
MAΘ National Convention 2023

Given $\triangle ABC \sim \triangle RST$ and the length of the sides of $\triangle ABC$ are $14, 11,$ and 4. The longest side of $\triangle RST$ is 28. Find the perimeter of $\triangle RST$.

Answer : _____

Round 1 2 3 4 5

#6 Geometry – Hustle
MAΘ National Convention 2023

Given $\triangle ABC \sim \triangle RST$ and the length of the sides of $\triangle ABC$ are $14, 11,$ and 4. The longest side of $\triangle RST$ is 28. Find the perimeter of $\triangle RST$.

Answer : _____

Round 1 2 3 4 5

#6 Geometry – Hustle
MAΘ National Convention 2023

Given $\triangle ABC \sim \triangle RST$ and the length of the sides of $\triangle ABC$ are $14, 11,$ and 4. The longest side of $\triangle RST$ is 28. Find the perimeter of $\triangle RST$.

Answer : _____

Round 1 2 3 4 5

#6 Geometry – Hustle
MAΘ National Convention 2023

Given $\triangle ABC \sim \triangle RST$ and the length of the sides of $\triangle ABC$ are $14, 11,$ and 4. The longest side of $\triangle RST$ is 28. Find the perimeter of $\triangle RST$.

Answer : _____

Round 1 2 3 4 5

#7 Geometry – Hustle
MAΘ National Convention 2023

A right triangle has hypotenuse of length z, and the legs have lengths x and y. What is the length of the altitude from the right angle to the hypotenuse?

Answer : ____________________

Round 1 2 3 4 5

#7 Geometry – Hustle
MAΘ National Convention 2023

A right triangle has hypotenuse of length z, and the legs have lengths x and y. What is the length of the altitude from the right angle to the hypotenuse?

Answer : ____________________

Round 1 2 3 4 5

#7 Geometry – Hustle
MAΘ National Convention 2023

A right triangle has hypotenuse of length z, and the legs have lengths x and y. What is the length of the altitude from the right angle to the hypotenuse?

Answer : ____________________

Round 1 2 3 4 5

#7 Geometry – Hustle
MAΘ National Convention 2023

A right triangle has hypotenuse of length z, and the legs have lengths x and y. What is the length of the altitude from the right angle to the hypotenuse?

Answer : ____________________

Round 1 2 3 4 5

#8 Geometry – Hustle
MAΘ National Convention 2023

For a positive integer x, a 3-sided figure has side lengths of $2x - 7$, $4x + 2$, and $5x + 9$. What is the sum of the values of x for which this figure is NOT a triangle?

Answer : _____

Round 1 2 3 4 5

#8 Geometry – Hustle
MAΘ National Convention 2023

For a positive integer x, a 3-sided figure has side lengths of $2x - 7$, $4x + 2$, and $5x + 9$. What is the sum of the values of x for which this figure is NOT a triangle?

Answer : _____

Round 1 2 3 4 5

#8 Geometry – Hustle
MAΘ National Convention 2023

For a positive integer x, a 3-sided figure has side lengths of $2x - 7$, $4x + 2$, and $5x + 9$. What is the sum of the values of x for which this figure is NOT a triangle?

Answer : _____

Round 1 2 3 4 5

#8 Geometry – Hustle
MAΘ National Convention 2023

For a positive integer x, a 3-sided figure has side lengths of $2x - 7$, $4x + 2$, and $5x + 9$. What is the sum of the values of x for which this figure is NOT a triangle?

Answer : _____

Round 1 2 3 4 5

#9 Geometry – Hustle
MAΘ National Convention 2023

What is the smaller angle (in degrees) between the hour and minute hand of an analog clock at time $6:15$?

Answer : ____________________

Round 1 2 3 4 5

#9 Geometry – Hustle
MAΘ National Convention 2023

What is the smaller angle (in degrees) between the hour and minute hand of an analog clock at time $6:15$?

Answer : ____________________

Round 1 2 3 4 5

#9 Geometry – Hustle
MAΘ National Convention 2023

What is the smaller angle (in degrees) between the hour and minute hand of an analog clock at time $6:15$?

Answer : ____________________

Round 1 2 3 4 5

#9 Geometry – Hustle
MAΘ National Convention 2023

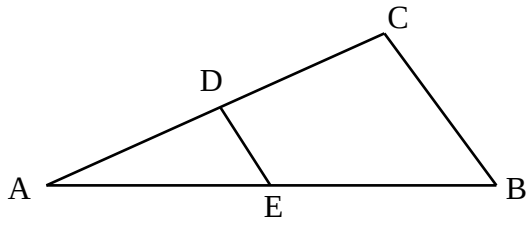
What is the smaller angle (in degrees) between the hour and minute hand of an analog clock at time $6:15$?

Answer : ____________________

Round 1 2 3 4 5

#10 Geometry – Hustle
MAΘ National Convention 2023

In triangle ACB, AD = DC and AE = EB. If DE = $4x + 30$ and CB = $10x + 20$, then give the length of BC.

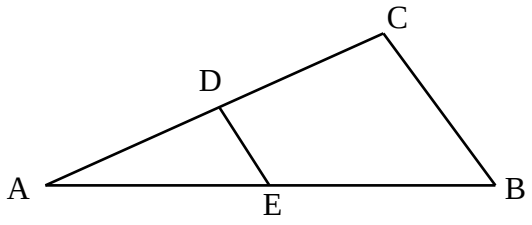


Answer : _____

Round 1 2 3 4 5

#10 Geometry – Hustle
MAΘ National Convention 2023

In triangle ACB, AD = DC and AE = EB. If DE = $4x + 30$ and CB = $10x + 20$, then give the length of BC.

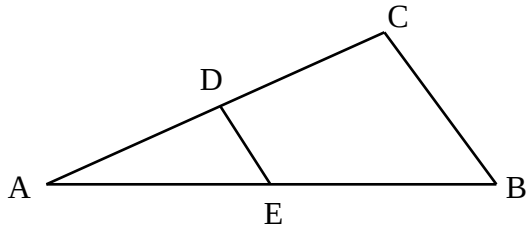


Answer : _____

Round 1 2 3 4 5

#10 Geometry – Hustle
MAΘ National Convention 2023

In triangle ACB, AD = DC and AE = EB. If DE = $4x + 30$ and CB = $10x + 20$, then give the length of BC.

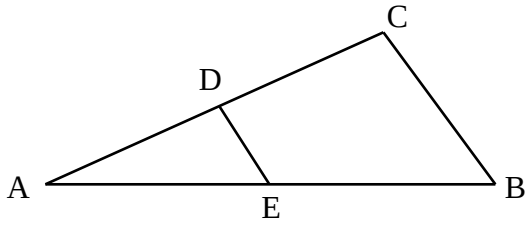


Answer : _____

Round 1 2 3 4 5

#10 Geometry – Hustle
MAΘ National Convention 2023

In triangle ACB, AD = DC and AE = EB. If DE = $4x + 30$ and CB = $10x + 20$, then give the length of BC.



Answer : _____

Round 1 2 3 4 5

#11 Geometry – Hustle
MAΘ National Convention 2023

A trapezoid has height 12 and legs 13 and 15. The shorter base has length 10. What is the length of the longer base?

Answer : _____

Round 1 2 3 4 5

#11 Geometry – Hustle
MAΘ National Convention 2023

A trapezoid has height 12 and legs 13 and 15. The shorter base has length 10. What is the length of the longer base?

Answer : _____

Round 1 2 3 4 5

#11 Geometry – Hustle
MAΘ National Convention 2023

A trapezoid has height 12 and legs 13 and 15. The shorter base has length 10. What is the length of the longer base?

Answer : _____

Round 1 2 3 4 5

#11 Geometry – Hustle
MAΘ National Convention 2023

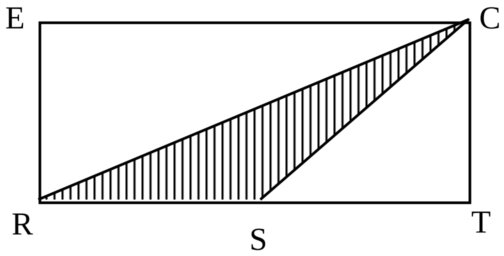
A trapezoid has height 12 and legs 13 and 15. The shorter base has length 10. What is the length of the longer base?

Answer : _____

Round 1 2 3 4 5

#12 Geometry – Hustle
MAΘ National Convention 2023

Find the perimeter of the shaded region in rectangle RECT where ER = 1, TR is twice ER, and S is the midpoint of RT.

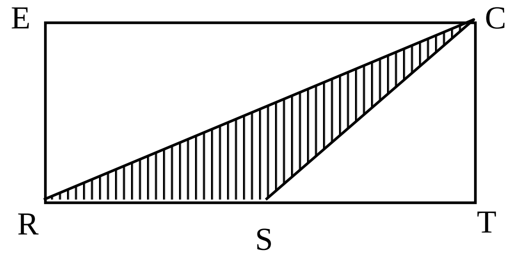


Answer : ____________________

Round 1 2 3 4 5

#12 Geometry – Hustle
MAΘ National Convention 2023

Find the perimeter of the shaded region in rectangle RECT where ER = 1, TR is twice ER, and S is the midpoint of RT.

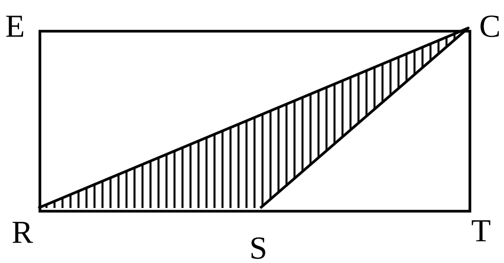


Answer : ____________________

Round 1 2 3 4 5

#12 Geometry – Hustle
MAΘ National Convention 2023

Find the perimeter of the shaded region in rectangle RECT where ER = 1, TR is twice ER, and S is the midpoint of RT.

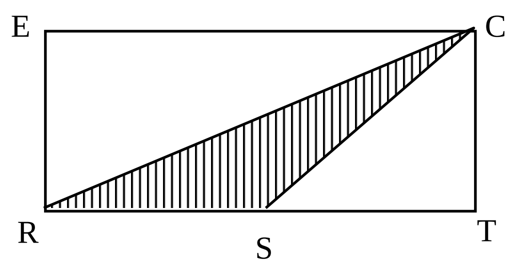


Answer : ____________________

Round 1 2 3 4 5

#12 Geometry – Hustle
MAΘ National Convention 2023

Find the perimeter of the shaded region in rectangle RECT where ER = 1, TR is twice ER, and S is the midpoint of RT.



Answer : ____________________

Round 1 2 3 4 5

#13 Geometry – Hustle
MAΘ National Convention 2023

How many regular polygons have exterior angles that are integers and interior angles that are not integers?

Answer : _____

Round 1 2 3 4 5

#13 Geometry – Hustle
MAΘ National Convention 2023

How many regular polygons have exterior angles that are integers and interior angles that are not integers?

Answer : _____

Round 1 2 3 4 5

#13 Geometry – Hustle
MAΘ National Convention 2023

How many regular polygons have exterior angles that are integers and interior angles that are not integers?

Answer : _____

Round 1 2 3 4 5

#13 Geometry – Hustle
MAΘ National Convention 2023

How many regular polygons have exterior angles that are integers and interior angles that are not integers?

Answer : _____

Round 1 2 3 4 5

#14 Geometry – Hustle
MAΘ National Convention 2023

A diagonal of a rectangle has length $2\sqrt{10}$ and the area of the rectangle is 12. What are the dimensions of the rectangle?

Answer : _____

Round 1 2 3 4 5

#14 Geometry – Hustle
MAΘ National Convention 2023

A diagonal of a rectangle has length $2\sqrt{10}$ and the area of the rectangle is 12. What are the dimensions of the rectangle?

Answer : _____

Round 1 2 3 4 5

#14 Geometry – Hustle
MAΘ National Convention 2023

A diagonal of a rectangle has length $2\sqrt{10}$ and the area of the rectangle is 12. What are the dimensions of the rectangle?

Answer : _____

Round 1 2 3 4 5

#14 Geometry – Hustle
MAΘ National Convention 2023

A diagonal of a rectangle has length $2\sqrt{10}$ and the area of the rectangle is 12. What are the dimensions of the rectangle?

Answer : _____

Round 1 2 3 4 5

#15 Geometry – Hustle
MAΘ National Convention 2023

Find the number of sides in a polygon such that the sum of the interior angles is eight times the sum of the exterior angles.

Answer : ____________________

Round 1 2 3 4 5

#15 Geometry – Hustle
MAΘ National Convention 2023

Find the number of sides in a polygon such that the sum of the interior angles is eight times the sum of the exterior angles.

Answer : ____________________

Round 1 2 3 4 5

#15 Geometry – Hustle
MAΘ National Convention 2023

Find the number of sides in a polygon such that the sum of the interior angles is eight times the sum of the exterior angles.

Answer : ____________________

Round 1 2 3 4 5

#15 Geometry – Hustle
MAΘ National Convention 2023

Find the number of sides in a polygon such that the sum of the interior angles is eight times the sum of the exterior angles.

Answer : ____________________

Round 1 2 3 4 5

#16 Geometry – Hustle
MAΘ National Convention 2023

Find the positive difference between the supplement and the complement of an acute angle with measure x degrees.

Answer : ____________________

Round 1 2 3 4 5

#16 Geometry – Hustle
MAΘ National Convention 2023

Find the positive difference between the supplement and the complement of an acute angle with measure x degrees.

Answer : ____________________

Round 1 2 3 4 5

#16 Geometry – Hustle
MAΘ National Convention 2023

Find the positive difference between the supplement and the complement of an acute angle with measure x degrees.

Answer : ____________________

Round 1 2 3 4 5

#16 Geometry – Hustle
MAΘ National Convention 2023

Find the positive difference between the supplement and the complement of an acute angle with measure x degrees.

Answer : ____________________

Round 1 2 3 4 5

#17 Geometry – Hustle
MAΘ National Convention 2023

What is the lateral area of a rectangular pyramid with height 9 and base dimensions 24×80?

Answer : _____

Round 1 2 3 4 5

#17 Geometry – Hustle
MAΘ National Convention 2023

What is the lateral area of a rectangular pyramid with height 9 and base dimensions 24×80?

Answer : _____

Round 1 2 3 4 5

#17 Geometry – Hustle
MAΘ National Convention 2023

What is the lateral area of a rectangular pyramid with height 9 and base dimensions 24×80?

Answer : _____

Round 1 2 3 4 5

#17 Geometry – Hustle
MAΘ National Convention 2023

What is the lateral area of a rectangular pyramid with height 9 and base dimensions 24×80?

Answer : _____

Round 1 2 3 4 5

#18 Geometry – Hustle
MAΘ National Convention 2023

Find the converse of the inverse of the contrapositive of the inverse of the converse of the converse of the inverse of the converse of the contrapositive of a statement.

Answer : ____________________

Round 1 2 3 4 5

#18 Geometry – Hustle
MAΘ National Convention 2023

Find the converse of the inverse of the contrapositive of the inverse of the converse of the converse of the inverse of the converse of the contrapositive of a statement.

Answer : ____________________

Round 1 2 3 4 5

#18 Geometry – Hustle
MAΘ National Convention 2023

Find the converse of the inverse of the contrapositive of the inverse of the converse of the converse of the inverse of the converse of the contrapositive of a statement.

Answer : ____________________

Round 1 2 3 4 5

#18 Geometry – Hustle
MAΘ National Convention 2023

Find the converse of the inverse of the contrapositive of the inverse of the converse of the converse of the inverse of the converse of the contrapositive of a statement.

Answer : ____________________

Round 1 2 3 4 5

#19 Geometry – Hustle
MAΘ National Convention 2023

A right circular cylinder with its diameter equal to its height is inscribed in a right circular cone. The cone has diameter 10 and altitude 12, and the axes of the cylinder and cone coincide. Find the radius of the cylinder.

Answer : ____________________

Round 1 2 3 4 5

#19 Geometry – Hustle
MAΘ National Convention 2023

A right circular cylinder with its diameter equal to its height is inscribed in a right circular cone. The cone has diameter 10 and altitude 12, and the axes of the cylinder and cone coincide. Find the radius of the cylinder.

Answer : ____________________

Round 1 2 3 4 5

#19 Geometry – Hustle
MAΘ National Convention 2023

A right circular cylinder with its diameter equal to its height is inscribed in a right circular cone. The cone has diameter 10 and altitude 12, and the axes of the cylinder and cone coincide. Find the radius of the cylinder.

Answer : ____________________

Round 1 2 3 4 5

#19 Geometry – Hustle
MAΘ National Convention 2023

A right circular cylinder with its diameter equal to its height is inscribed in a right circular cone. The cone has diameter 10 and altitude 12, and the axes of the cylinder and cone coincide. Find the radius of the cylinder.

Answer : ____________________

Round 1 2 3 4 5

#20 Geometry – Hustle
MAΘ National Convention 2023

A rhombus contains a 120-degree angle. What is the ratio of the length of its longer diagonal to the length of its shorter diagonal?

Answer : ____________________

Round 1 2 3 4 5

#20 Geometry – Hustle
MAΘ National Convention 2023

A rhombus contains a 120-degree angle. What is the ratio of the length of its longer diagonal to the length of its shorter diagonal?

Answer : ____________________

Round 1 2 3 4 5

#20 Geometry – Hustle
MAΘ National Convention 2023

A rhombus contains a 120-degree angle. What is the ratio of the length of its longer diagonal to the length of its shorter diagonal?

Answer : ____________________

Round 1 2 3 4 5

#20 Geometry – Hustle
MAΘ National Convention 2023

A rhombus contains a 120-degree angle. What is the ratio of the length of its longer diagonal to the length of its shorter diagonal?

Answer : ____________________

Round 1 2 3 4 5

#21 Geometry – Hustle
MAΘ National Convention 2023

What is the volume of a regular octahedron with edge length 7?

Answer : _____

Round 1 2 3 4 5

#21 Geometry – Hustle
MAΘ National Convention 2023

What is the volume of a regular octahedron with edge length 7?

Answer : _____

Round 1 2 3 4 5

#21 Geometry – Hustle
MAΘ National Convention 2023

What is the volume of a regular octahedron with edge length 7?

Answer : _____

Round 1 2 3 4 5

#21 Geometry – Hustle
MAΘ National Convention 2023

What is the volume of a regular octahedron with edge length 7?

Answer : _____

Round 1 2 3 4 5

#22 Geometry – Hustle
MAΘ National Convention 2023

Find the radius of the circle circumscribed about an equilateral triangle of side 12.

Answer : ____________________

Round 1 2 3 4 5

#22 Geometry – Hustle
MAΘ National Convention 2023

Find the radius of the circle circumscribed about an equilateral triangle of side 12.

Answer : ____________________

Round 1 2 3 4 5

#22 Geometry – Hustle
MAΘ National Convention 2023

Find the radius of the circle circumscribed about an equilateral triangle of side 12.

Answer : ____________________

Round 1 2 3 4 5

#22 Geometry – Hustle
MAΘ National Convention 2023

Find the radius of the circle circumscribed about an equilateral triangle of side 12.

Answer : ____________________

Round 1 2 3 4 5

#23 Geometry – Hustle
MAΘ National Convention 2023

In circle M, chords $\overline{RS}$ and $\overline{TU}$ intersect at X. If $RX = 15$, $XS = 18$, and $TX : XU = 3:10$, then find XU.

Answer : _____

Round 1 2 3 4 5

#23 Geometry – Hustle
MAΘ National Convention 2023

In circle M, chords $\overline{RS}$ and $\overline{TU}$ intersect at X. If $RX = 15$, $XS = 18$, and $TX : XU = 3:10$, then find XU.

Answer : _____

Round 1 2 3 4 5

#23 Geometry – Hustle
MAΘ National Convention 2023

In circle M, chords $\overline{RS}$ and $\overline{TU}$ intersect at X. If $RX = 15$, $XS = 18$, and $TX : XU = 3:10$, then find XU.

Answer : _____

Round 1 2 3 4 5

#23 Geometry – Hustle
MAΘ National Convention 2023

In circle M, chords $\overline{RS}$ and $\overline{TU}$ intersect at X. If $RX = 15$, $XS = 18$, and $TX : XU = 3:10$, then find XU.

Answer : _____

Round 1 2 3 4 5

#24 Geometry – Hustle
MAΘ National Convention 2023

DOKR is a rhombus with the measure of angle *D* equal to 60° and *DO* = 4. If *X* is the midpoint of segment *DO*, find the area of quadrilateral *OXRK*.

Answer : ____________________

Round 1 2 3 4 5

#24 Geometry – Hustle
MAΘ National Convention 2023

DOKR is a rhombus with the measure of angle *D* equal to 60° and *DO* = 4. If *X* is the midpoint of segment *DO*, find the area of quadrilateral *OXRK*.

Answer : ____________________

Round 1 2 3 4 5

#24 Geometry – Hustle
MAΘ National Convention 2023

DOKR is a rhombus with the measure of angle *D* equal to 60° and *DO* = 4. If *X* is the midpoint of segment *DO*, find the area of quadrilateral *OXRK*.

Answer : ____________________

Round 1 2 3 4 5

#24 Geometry – Hustle
MAΘ National Convention 2023

DOKR is a rhombus with the measure of angle *D* equal to 60° and *DO* = 4. If *X* is the midpoint of segment *DO*, find the area of quadrilateral *OXRK*.

Answer : ____________________

Round 1 2 3 4 5

#25 Geometry – Hustle
MAΘ National Convention 2023

Each of the statements below can be completed with the word always, sometimes or never. How many of the statements below will be completed with the word sometimes?

A square is _____ a rectangle.

The diagonals of a rectangle are _____congruent.

The diagonals of a parallelogram _____bisect the angles.

A trapezoid _____has three congruent sides.

Answer : _____

Round 1 2 3 4 5

#25 Geometry – Hustle
MAΘ National Convention 2023

Each of the statements below can be completed with the word always, sometimes or never. How many of the statements below will be completed with the word sometimes?

A square is _____ a rectangle.

The diagonals of a rectangle are _____congruent.

The diagonals of a parallelogram _____bisect the angles.

A trapezoid _____has three congruent sides.

Answer : _____

Round 1 2 3 4 5

#25 Geometry – Hustle
MAΘ National Convention 2023

Each of the statements below can be completed with the word always, sometimes or never. How many of the statements below will be completed with the word sometimes?

A square is _____ a rectangle.

The diagonals of a rectangle are _____congruent.

The diagonals of a parallelogram _____bisect the angles.

A trapezoid _____has three congruent sides.

Answer : _____

Round 1 2 3 4 5

#25 Geometry – Hustle
MAΘ National Convention 2023

Each of the statements below can be completed with the word always, sometimes or never. How many of the statements below will be completed with the word sometimes?

A square is _____ a rectangle.

The diagonals of a rectangle are _____congruent.

The diagonals of a parallelogram _____bisect the angles.

A trapezoid _____has three congruent sides.

Answer : _____

Round 1 2 3 4 5